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# CHILD DEVELOPMENT

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## AGE AND SEX DIFFERENCES IN MOTIVATIONAL ORIENTATION TO THE COMMUNICATIVE ACT

RONALD PENNY

*Australian National University*

In our everyday communication relationships we constantly make inferences, perhaps not always consciously, about the communicator's motivation from both what he says and how he says it. We observe the fact that he repeatedly returns to particular topics, that he selects some aspects of a topic and disregards others, that he uses a particular tone of voice or style of speech, and so on. From such data we may infer that he has a "one track mind," that he is biased, that he is being sincere or insincere. Probably most inferences of this kind are made automatically, on the basis of very limited data together with rather broad assumptions about human nature. We rarely go to the trouble of verifying our inferences by further observation or by seeking corroboration of their validity from other persons. One result of this imprecision is that we have little knowledge of developmental trends concerning the aim or orientation of communication. This paper is a report of an experiment directed toward that end. We shall present results which throw some light on the motivational orientation of statements made by Australian school children concerning the content of their communications on various topics.

### PREVIOUS RESEARCH

A great deal of evidence concerning sex differences in content was accumulated during the 1920's and 1930's (1, 4, 5, 7, 9). In the main, the data were collected by recording snatches of conversation overheard in the street. Attempts were made to determine the effects of various independent variables such as the communicant's social status, the sex-composition of the communicating pair (man-to-man, man-to-woman, etc.), and the social setting within which the communication took place, but the dependent variable was usually simply the amount of "thing-related" and "person-related" content. On the whole, the results of these studies uniformly indicate the presence of sex differences; men tend to talk about "things" and women about "persons." Many other studies in related fields such as interests, values, reading matter, and movie preferences are congruent with those concerned with conversation content.

The findings of Piaget (8) in connection with the language behavior of children and those of other investigators who have applied his methods of categorizing language behavior (2, 3, 6) are also relevant to our present

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concern, for here we have some implicit emphasis on the functions served by various types of communicative acts. Language behavior is "egocentric" when the child "does not bother to know to whom he is speaking nor whether he is being listened to . . . (he) speaks only about himself . . . he feels no desire to influence his hearer nor to tell him anything" (8, pp. 9-10). His speech is "socialized" when there is "interchange of ideas," criticism of the work or behavior of others, when there is definite interaction. Clearly, there are motivational implications to these definitions. In their present form, however, they are far from adequate for the purpose of making clear-cut categorizations of communicative acts from the point of view of their motivational orientations.

In this paper we shall be concerned with data which bear somewhat more directly on the extent to which communications betray motivational orientations and which are related also to the earlier research concerned with sex differences in communication content.

### METHOD OF CATEGORIZING MOTIVATIONAL ORIENTATION

By motivational orientation we mean something like this: we assume that all communicative acts are motivated and that the performance of the act partially or wholly satisfies the need. The question is, just what kind of need are we talking about? Alternatively, what kind of satisfaction is the communication aimed at? One way of answering this question is

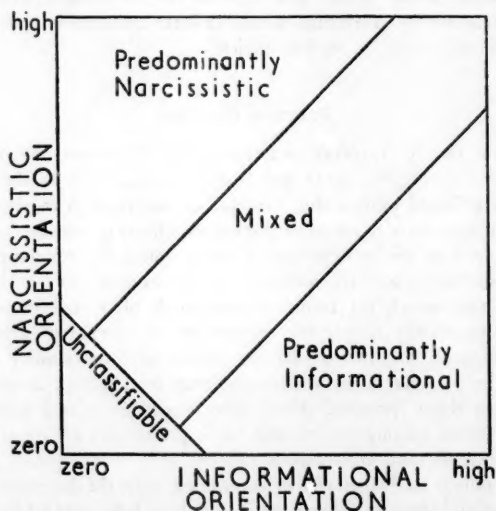


FIGURE 1—Motivational orientation categories.

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to state the extent to which the communication is oriented toward information transfer and the extent to which it is concerned with self-involvement. We shall refer to these two dimensions as informational and narcissistic orientations. The reason for choosing these two dimensions rather than others is that they permit the locating of the intent of communications in a space constructed on the basis of two variables which are relevant to virtually all communications; furthermore, no communication will have a location of zero on both of these two dimensions. Thus, if we represent this space by Figure 1, every communication can be located at a point other than the zero-zero point. Clearly, we are dealing with only one way of describing motivational orientation. There are, of course, other dimensions that could be used in specific instances. For example, a communication such as "How about coming around to my place to play after school's out?" might indicate the presence of an affiliation motive but such specific dimensions would be relevant to comparatively few communications.

The problem of assigning precise informational and narcissistic values to communications is a difficult one. In the present analysis we have side-stepped this issue and have used a classificatory scheme indicated by the dividing lines in Figure 1. The definitions of the categories are:

Informational orientation—the communication content is predominantly concerned with the objective qualities of physical objects or persons. The inclusion of the self in the form of reference to one's own possessions or opinions must be slight compared with the objective "loading" of the communication.

Narcissistic orientation—the content of the communication is predominantly concerned with drawing attention to the self.

The "mixed" and "unclassifiable" categories will be referred to later.

TABLE I  
CLASS SIZE AND MEAN AGE

	FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
	<i>N</i>	<i>Mean Age</i>	<i>N</i>	<i>Mean Age</i>	<i>N</i>	<i>Mean Age</i>	<i>N</i>	<i>Mean Age</i>
Boys . . .	25	13-4	37	14-5	29	15-5	21	16-2
Girls . . .	28	12-11	19	13-11	20	14-11	16	15-8

## SUBJECTS

The Ss comprised the first four grades of a boys' and a girls' grammar school, 112 boys and 83 girls. We shall refer to these grades as "First Year," "Second Year," etc. There was one class for each grade at each school. Table 1 shows the sizes of the classes and the mean ages of the members. The scholastic level of First Year corresponds to first year High School (Australian system).

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### DATA

The data were collected in individual interview sessions. Previous to the interview each *S* had filled in questionnaires in class concerning his communicatee selections for 12 different topics. These questions were in the form: "Whom do you talk to about . . . ?" The topics were: favorite hobby, what you want to do when you leave school, personal secrets, school work, dreams, father and mother, films and film stars, teachers, girls (for boys) or boys (for girls), jokes, school sport, and religion. In the interview the *S* was asked, with respect to 10 of these topics (jokes and personal secrets being excluded): "When you talk about . . . just what are the kinds of things you do talk about?" The responses, which constitute the raw data of this analysis, were recorded verbatim.

### ANALYSIS

Every response was classified as being either predominantly informationally or narcissistically oriented with the exception of those that clearly contained both orientations ("mixed") and those that contained neither ("unclassifiable"). The following are examples for each of the categories.

<i>Topic</i>	<i>Response</i>
	<i>Informational Orientation</i>
Girls	"Where they come from, where they live, if they can dance, if they go out much, if they've got any brothers here, what sort of a girl she is—big, tall or thin."
School work	"Lessons, interest of the work, wheat seeds, contour-ploughing, oxy-welding."
Films and film stars	"The roles they're suited for, the clothes they wear and the places they go when they're not acting, all their husbands, sort of houses they live in, the way they entertain."
	<i>Narcissistic Orientation</i>
School sport	"Why I wasn't picked, that I always go to practice and never get picked."
Dreams	"What I dreamt about, adventures, girls, driving Dad's car and smashing it up."
Father and mother	"How Mum cooks, about going to work with my father, how I like being at home with them during the holidays, how much pocket-money they let me have."
	<i>Mixed Orientation</i>
Teachers	"If they give you the cane, if they are cranky, if you've got a good house-master, what they give you in class, when they take you next."
Boys	"The things they do like climbing trees, about them teaching us to do it, what school they go to, where we have seen them before."
	<i>Unclassifiable</i>
	"That's a secret."
	"I'm afraid I'm not very much help to you."
	"I used to talk about it but I don't now."

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This kind of analysis can never be thoroughly objective because of the fact that the categorizations are not made on the basis of the structural aspects of the responses. In the absence of such objective classificatory criteria the projective component in the interpretations is likely to be of considerable importance. For this reason a reliability check was made by having a randomly selected sample of 50 responses from the boys' data and 50 from the girls' classified independently by an experienced anthropologist. The result of this check was as follows: 65 per cent complete agreement, 27 per cent partial disagreement (as when one judge classified a response as being informational or narcissistic and the other as mixed), 8 per cent complete disagreement (as when one judge classified the response as informational and the other as narcissistic). No significant judge-bias in the informational or narcissistic direction was present in the 27 partial disagreement instances. Whilst 65 per cent complete agreement is not high it was felt that this, together with the mere 8 per cent complete disagreement, was sufficient to justify the belief that the categorizations were not unduly biased.

## RESULTS

Tables 2 and 3 show the percentages of responses in each of the categories. In Table 2 the data have been grouped in terms of age level. Such a grouping is not identical with a grouping in terms of class level (First Year, Second Year, etc.) as there was a considerable amount of age overlap between classes. Amongst the Second Year boys there were, for instance, 13 Ss between 13-0 and 13-11 years, 16 between 14-0 and 14-11, 7 between 15-0 and 15-11, and 1 aged 16-1. Also, as may be seen from Table 1, there was a six-months difference between the mean ages of the girls' classes compared with the boys' at each of the class levels. Table 2

TABLE 2  
PERCENTAGES OF RESPONSES IN MOTIVATIONAL CATEGORIES  
(Data grouped according to chronological age)

Age Level	P E R C E N T A G E S *									
	N		Informational		Narcissistic		Mixed		Unclassifiable	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
12-0 to 12-11 ..	6	18	53	31	13	24	15	26	18	19
13-0 to 13-11 ..	27	19	46	39	13	20	28	31	13	9
14-0 to 14-11 ..	31	21	42	43	15	17	26	29	17	11
15-0 to 15-11 ..	32	18	52	47	10	12	25	35	13	6
16-0 to 16-11 ..	16	7	55	43	8	10	24	41	14	6
17-0 to 17-11 ..	5	—	58	—	8	—	16	—	17	—

\* Significance of sex differences (sign test): Informational,  $p = .19$ ; Narcissistic,  $p = .03$ ; Mixed,  $p = .03$ .

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holds chronological age constant and is, therefore, a more accurate representation of sex differences in motivational orientation than Table 3 in which the data are grouped in terms of class level. Table 3 shows essentially the same trends as Table 2, though as has been pointed out, it is not really suitable for intersex comparisons. On the other hand, there are grounds for preferring it to Table 2 for intrasex age comparisons. The chief reason is that about 90 per cent of the Ss' communicatees were drawn from their school classes rather than their age groups. The answer to the question: "When you talk about . . . just what are the kinds of things you do talk about?" referred, therefore, to communication within the class group. Furthermore, there were, presumably, mental age reasons for the age overlap between classes. A 14-year-old boy in Fourth Year is presumably rather brighter than a 14-year-old in First Year. It seems quite plausible, therefore, that a grouping of the data in terms of class level is not only justifiable but also psychologically more meaningful for intrasex age comparisons than a chronological age grouping.<sup>1</sup>

TABLE 3  
PERCENTAGES OF RESPONSES IN MOTIVATIONAL CATEGORIES  
(Data grouped according to class level)

	P E R C E N T A G E S									
	N		Informational		Narcissistic		Mixed		Unclassifiable	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1st Year . . . . .	25	28	42	31	18	24	26	28	14	17
2nd Year . . . . .	37	19	46	42	13	17	26	31	15	10
3rd Year . . . . .	29	20	56	46	10	12	22	32	12	10
4th Year . . . . .	21	16	48	47	8	14	22	36	22	3

*Differences Between Class Levels (Table 3)*

1. The percentages in Table 3 indicate fairly conclusively that motivational orientation, as we have defined it, changes with increasing (mental) age. With only two minor exceptions (Fourth Year boys, informational, and Fourth Year girls, narcissistic) the informational percentages increase and the narcissistic decrease.

2. Within each sex group the informational percentages are greater than the narcissistic at all class levels. The differences, of course, become greater with increasing age.

<sup>1</sup> The total *N* is less in Table 3 than in Table 2 because of the fact that the members of the small Fifth Year classes have been included in Table 2 but, because of their sizes, not included in Table 3.

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3. The mixed percentages for the boys decrease slightly with increasing age; those for the girls increase.

The same trends occur in Table 2 though less unequivocally.

### *Sex Differences (Table 2)*

4. At each age level, with one exception (14-0 to 14-11), the boys tend to be somewhat more informationally inclined than the girls. In all cases the girls are more narcissistically inclined than the boys.

5. The mixed percentages for the girls are greater than those for the boys at all age levels. This would seem to indicate that for the girls there is a counteracting trend to that shown by the informational percentages. The degree of predominantly narcissistic orientation decreases with increasing age but instead of this orientation changing clearly to an informational one, as seems to be the case with the boys, more and more responses have to be classified as being of mixed orientation—perhaps a kind of narcissistic “contamination” of what would otherwise be informationally oriented responses.

## DISCUSSION

Analysis of the interpersonal communication process ought to be especially useful from the point of view of throwing light on many aspects of the socialization process. This is because the performance of the communicative act involves a variety of decisions. Decisions have to be made in connection with the selection of the communicatee, the topic, the appropriateness of the social setting for the particular act, and so on. This is not to say that there is conscious deliberation before or introspective analysis after each act. The performance of the act does, however, clearly involve the interplay of many social and individual forces. One such force is, of course, the communicator's motivation.

In a sense, the communicative act is an experiment in which the communicator gets more or less immediate feedback concerning others' evaluations of him and his communication procedures. Such feedback must constitute an important aspect of the socialization process.

Motivational orientation, we have assumed, is betrayed by the mode of expression of the content of the communication. Presumably, this information is available to and reacted to by the communicatee thus providing the communicator with feedback concerning the acceptability of his motivational orientation. In this way motivational orientations may well be modified by the social forces existing within the peer group. There may be and probably are other modifying agencies. Parents and teachers may well react to what they perceive to be particular orientations in approving or disapproving ways. They may, for example, punish boastfulness.

Our data show that certain modifications to motivational orientation are taking place between the ages of 12 and 17. We are suggesting that these



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modifications are being brought about, at least in part, by peer group forces. The communication data we have analysed are, after all, *peer group* communication data. We are not here concerned with the basis of these forces but rather with showing that they apparently exist and that they affect the sexes differently.

The general direction of the change is, as we have seen, from narcissistic toward informational. Although extrapolation on the basis of such data involves the assumption of certain developmental constants, it would seem to be a reasonable guess that for age groups lower than our First Year level the proportion of narcissistic responses would be greater. Piaget's findings support this guess. His "ego-centrism" is not synonymous with our narcissistic orientation category but a rearrangement of his data in such a way as to fit fairly well with our definitions indicates a narcissistic proportion of between 0.55 and 0.66 for children between the ages of seven and eight.<sup>2</sup> Similarly, we should expect that there would be further increases in the informational proportion with further increases in age. Both these tendencies are, of course, limited. No communication can be "pure" in the sense of lacking either motivational orientation completely. But that is not a psychological issue.

## SUMMARY

It has been assumed that the motivational orientation of the communicative act is betrayed by the mode of expression of the content. A classificatory scheme and mode of analysis have been described and applied to content data obtained from school children of both sexes between the ages of 12 and 17. These data reveal certain age trends and sex differences. The relation of such an analysis to the investigation of the socialization process has been discussed.

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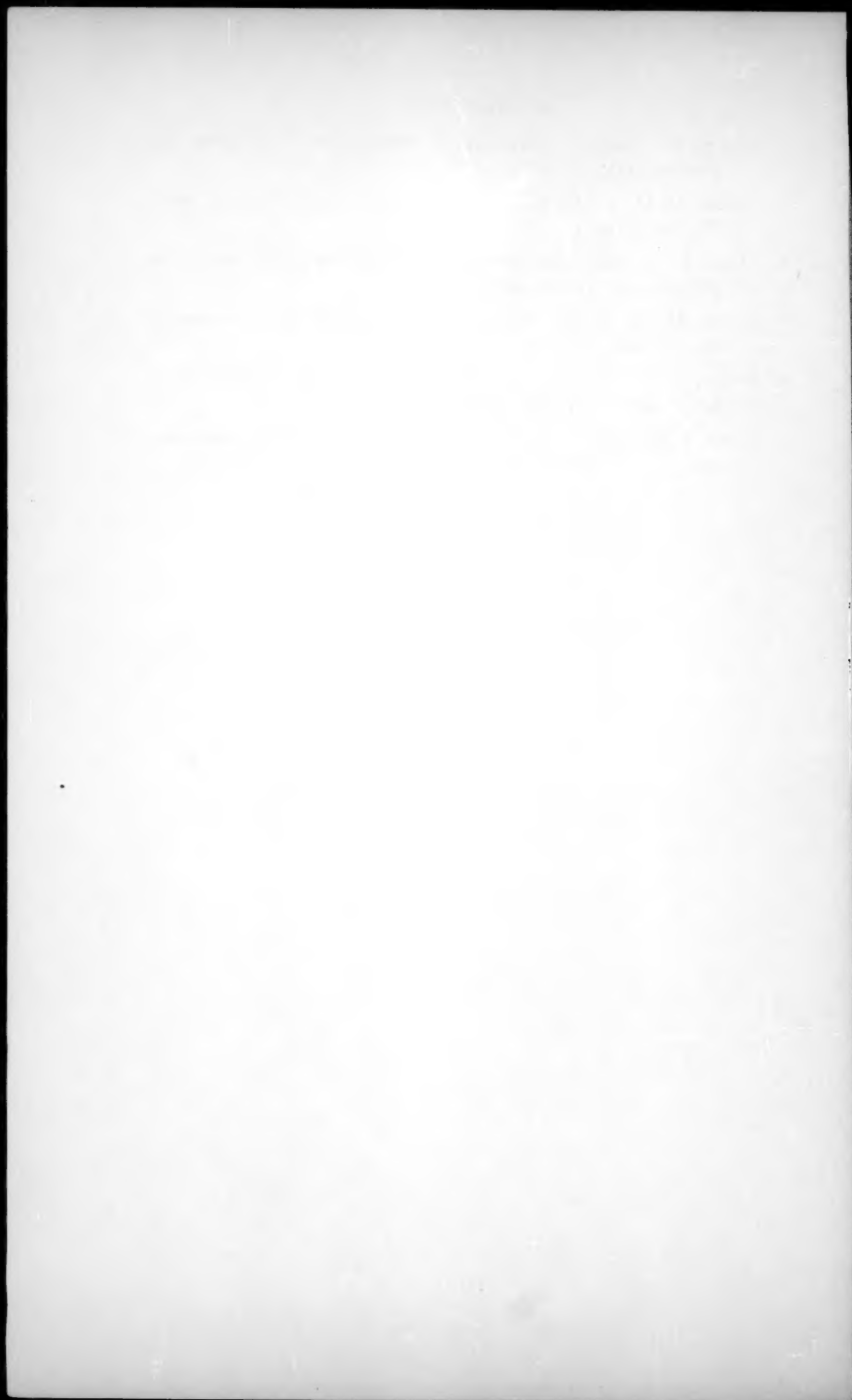
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<sup>2</sup> This rearrangement has been applied to the table which summarizes the data for the children Pie and Lev (8, Ch. 1, sec. 10) and consists of allocating collective monologue, criticism, and commands to our narcissistic category and adapted information and requests to our informational category. Because they cannot be unambiguously classified the following Piaget categories have had to be excluded: repetition, monologue, and answers.



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## PREDICTION OF SOCIAL ACCEPTANCE IN COMMUNITY YOUTH GROUPS

HELEN R. MARSHALL

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Community groups or clubs are a prominent feature of American life but have been ignored for the most part in research on social acceptance. No examples have been found by the author of their use in investigations of factors associated with social acceptance, although school, camp, industrial, and military groups have been frequently used for such studies. The research literature on these populations gives consistent support to some hypotheses concerned with factors affecting social acceptance. Enough variables appear to suggest that some be tested concurrently on a population different from any used originally. This initial step in (or test of) development of a theory of social acceptance is possible at the present time by use of the unexplored populations of community groups.

This investigation proposes to test the prediction for community youth groups of six hypotheses concerned with factors affecting sociometric acceptance. Specifically, the community youth group populations are as follows: (a) 23 Home Economics 4-H Clubs of 324 girls aged 10 to 20 years located in one Illinois county; (b) 22 Agriculture 4-H Clubs of 314 boys and 91 girls aged 10 to 20 years in the same county.

The six hypotheses were developed inductively from empirical evidence as research conclusions. They are listed below with a description of the measure or classification used in this investigation to define the factor. Complete citation of research literature is not attempted here; rather, reviews and reports are cited that list and describe the evidence for these hypotheses.

1. *In child or youth groups, age has a positive, low correlation (.15-.20) with sociometric status (21).* Within the school classes studied, standard deviations averaging around four months of age have been reported. Age had a possible nine-year range within the clubs of this investigation. Hence, age difference in months from the median age of the club is used as a measure of the factor of age in addition to chronological age in months.

2. *Sociometric status in both sex groups is higher for girls than for boys.* Sociometric scores are used in the sex comparisons of this investigation and have been so used earlier in only one report (10). It has been frequently reported that boys choose girls more often than girls choose boys on social acceptance tests (2, 5, 6).

3. *Level of performance or achievement in the skills and knowledge essential for or being taught to the group is positively related to sociometric status (15).* Two performance ratings are included in the 4-H Club program. One, the project rating, is made at the county contest by trained

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judges of an article (clothing, food, home furnishings) made by the girl as a part of project requirements in home economics clubs, or of an animal, fowl, or produce raised by agriculture club members. The home economics ratings of A, B, and C are comparable to grades of skill and knowledge used with other groups. Home economics project requirements attempt to adapt to age differences in performance. The five place agriculture ratings probably are not performance measures; i.e., quality of animals is affected by heredity so that ratings of these animals are not expected to relate to sociometric scores of club members. 4-H members may enroll in several projects, so any project rating of A placed the member in the A classification in this investigation.

The other performance rating is an end-of-the-year (September) project honor evaluation of members' ratings in all competitions and participation in all club activities and in community and school activities. Members must record activities on the project honor form to be considered, so that a member's submission of a filled out form does not necessarily imply performance in the rated aspects superior to all members not submitting these forms. Score points given to each activity and rating have been determined in past years by state extension specialists for use throughout the state. The forms submitted were scored by club leaders and committees of the county sponsoring groups at a county meeting. Scores of 90 to 100 were classed as State Project Honor, and of 75 to 89 as County Project Honor in home economics clubs. Classification was similar in agriculture clubs.

4. *Leadership is positively related to sociometric status* (15). This relationship has been reported for such definitions of leadership as near-sociometric choices by peers and ratings by superiors or observers of group interaction. Election to one of the five club offices is the definition of leadership used in this investigation. This definition is presumed to be comparable to peer leader nominations on near-sociometric tests. The author was unable to find any reports of the sociometric status of elected leaders in the groups of their election other than her report on women's clubs in this county (13). The second performance rating used to test hypothesis 3, the project honor form, resembles the leadership rating forms for superiors and observers used in many investigations of leadership. Possibly the test of this hypothesis would be more comparable to the supporting evidence if the project honor classification were used to define leadership rather than the less ambiguous election to office dichotomy.

5. *Family and community variables may relate to social acceptance in particular groups.* Studies report conflicting evidence on the presence and absence of relations between social acceptance and classifications of socioeconomic status (1, 3, 11, 16, 20), sibling status or number (1, 4, 9, 13, 21), place of residence (17), and race or nationality (7, 18, 19). Two dichotomous classifications of this type are used in this investigation: residence in town or on a farm, and attendance at the same or different schools.

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6. *Sociometric status in one group has a positive and fairly high correlation (.50-.60) with sociometric status in groups of different membership (14, 22).* Sociometric scores were obtained in both agriculture and home economics clubs for 33 girls, and within the county group attending District 4-H Club Camp for 15 members with scores in one of the two club populations.

### SUBJECTS AND PROCEDURES

All individuals and groups used as subjects (Ss) resided in one Illinois county. In the 1950 census, 87.5 per cent of the 25,000 county population was classified as rural, a city of about 3,000 population being classified as urban. The county was close to the rural Illinois average in home facilities, family income, value of farm products sold, and percentage of farm tenancy, and may be described as having the narrow range of socioeconomic status characteristic of rural areas in this section of the United States. It ranked in the upper fourth of Illinois counties in such measures of level of education as that 9.4 per cent of the farm adults aged 25 years or more had attended college, and a median of 9.1 school years had been completed by these adults.

The groups used in this investigation were 4-H Clubs, the youth organization for education in agriculture and home economics of the Extension Service of the University of Illinois and the U.S. Department of Agriculture. 4-H Clubs have been organized in this county for more than 25 years. Membership in each club tends to be limited to a specific geographical area, such as a township. Each township in the county had either an agriculture or home economics club, and the majority had both types of clubs.

The Home Economics 4-H Club members serving as Ss in this investigation were the 270 girls present at the regular club meeting at which the author administered the sociometric test. Tests were administered to all 23 clubs within a six-weeks period of June and early July, 1956, prior to all competitions. Ss constituted 83 per cent of the enrollment. Club size ranged from five to 28 members and Ss in each club from four to 27 girls. The mean number of meetings held by the club at the time of test administration was 7.26 with an *SD* of 1.86, and a range of three to 10. The age distribution of home economics Ss is presented in Figure 1.

The Agriculture 4-H Club members serving as Ss in this investigation were the 87 boys and 47 girls present at the regular meeting of eight clubs at which the author or the assistant farm or home advisers (in three clubs) administered the sociometric test. Selection of eight of the 22 clubs was biased by the attempt to include clubs in which home economics Ss were enrolled, but otherwise was determined by the possibility of test administration at regular meetings within six weeks of the test administration to the Home Economics 4-H Club in that township. Agriculture Ss constituted 81.5 per cent of the enrollment of the eight clubs. Girl Ss were 52 per cent of the girls enrolled in all agriculture clubs and boy Ss were 28

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per cent of the total enrollment of boys. Size of the eight clubs ranged from 13 to 40 members, and Ss in each club from 12 to 38. The mean number of meetings held by the clubs at the time of test administration was 5.88 with an *SD* of 1.46 and a range of four to nine. The age and sex distribution of agriculture Ss is presented in Figure 2.

Thirty-one members of the two club populations attended District 4-H Club Camp in mid-July for one week. The assistant home adviser individually administered the sociometric test to 26 members of the county group on the last day of camp attendance. Club scores were available for 15 of these campers, 13 girls from nine home economics clubs and two boys from the same agriculture club. Three girl campers were included among the 33 girls with scores in both agriculture and home economics clubs.

The measure of social acceptance was a three-question and three-choice form of the sociometric test. Each S was asked to choose three members present in his (her) group as answer to each of three questions: (a) With whom would you like to serve on a committee (any kind)? (b) With whom would you like to go to a county meeting, such as the spring rally, or the county show, or a demonstration school? (c) Whom do you like to sit with or talk to at your club meeting? Instructions stated that the same or different members could be named for each of the three questions.

In scoring the test, first choice for any question was given three points, second choice two points, the third choice one point. The sociometric score was one plus the sum of the weighted choices of the S by other Ss of the group.

The mean sociometric score for any group was necessarily 19 points since each S gave 18 points to others. Hence, Bartlett's test of homogeneity of variance was used to determine whether the scores in the clubs of each population were comparable. Differences in score variance of the 23 Home Economics 4-H Clubs and of the eight Agriculture 4-H Clubs were no greater than could have been expected by chance. It was possible, therefore, to treat sociometric scores of all Ss from one population as a single sample in analyses of relations with other factors. The population *SD* for sociometric scores was 11.2 in home economics clubs and 11.8 in agriculture clubs.

All other data were obtained from 4-H Club records kept in the county extension offices. Information used had been checked for accuracy by at least two of the adults most informed on that aspect: parents, leaders, or extension office personnel.

## RESULTS AND DISCUSSION

*Hypothesis 1. In child or youth groups, age has a positive, low correlation (.15-.20) with sociometric status.*

This hypothesis predicted the correlations obtained between sociometric scores and CA in months for these community youth groups, as shown in Table 1. The mean and median sociometric scores for each year of

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age (10-0 to 10-11, etc.) are plotted for home economics clubs in Figure 1, and, with sex separation, for agriculture clubs in Figure 2. Hypotheses that the relationship was linear could not be rejected for CA or the age deviation score (to be described) in either club population.

TABLE I

PRODUCT-MOMENT CORRELATIONS OF AGE WITH SOCIOMETRIC SCORES

Age Measures	SOCIOMETRIC SCORES			
	Home Economics	Agriculture 4-H Clubs		
	4-H Clubs N Girls=270	Boys N=87	Girls N=47	Total N=134
Chronological age in months . . . . .	.15*	.18	.42**	.22**
Months deviation + 50 from median age of club . . . . .	.29**	.29**	.24	.22**

\*  $r$  is significant at less than the .05 level.

\*\*  $r$  is significant at less than the .01 level.

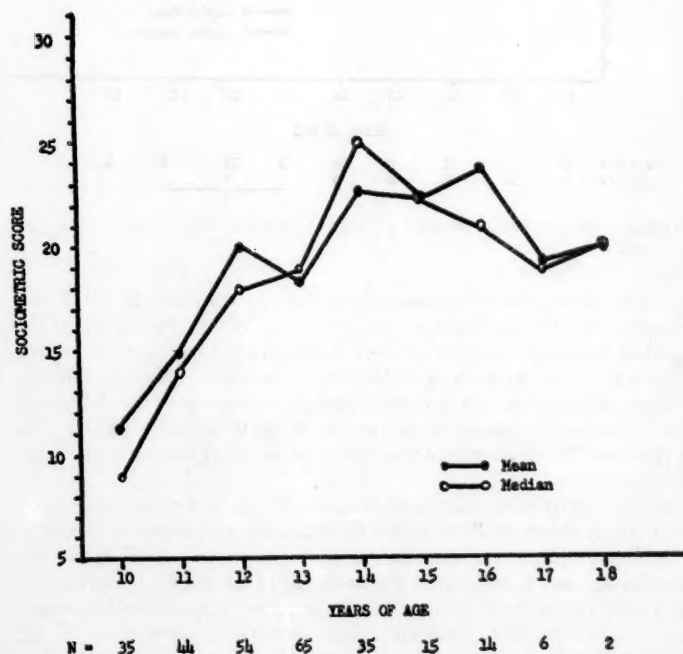


FIGURE 1—Relation of sociometric scores of Home Economics Club Ss to chronological age.

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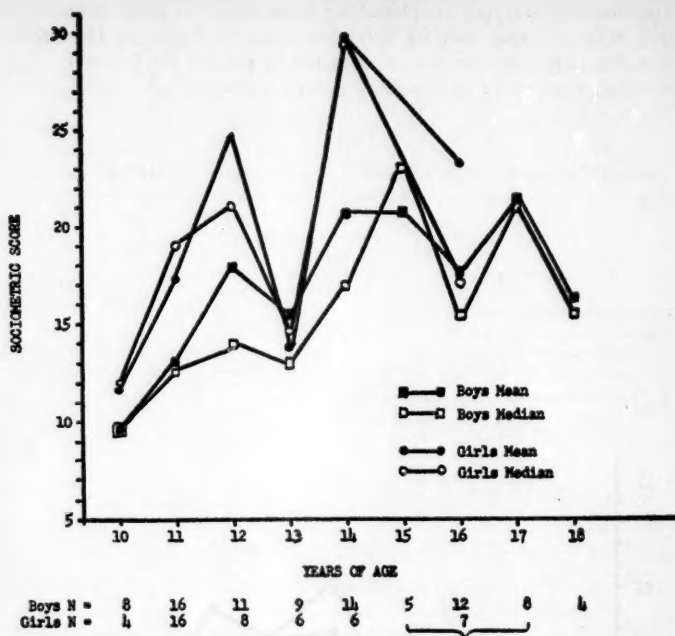


FIGURE 2—Relation of sociometric scores of Agriculture Club Ss to chronological age.

The mean age of home economics Ss was 13.3 years with an *SD* of 15.8 months, and the median age was 13.0 years. Within the 23 clubs, the median age ranged from 11.6 to 15.2 years, and the age range within the club was at least six years in all but four clubs. These descriptive statistics suggest that age deviation in months from the median age of the club might be a more useful measure of the relation of age to sociometric scores than *CA per se*. The measure used was months of deviation plus 50, to eliminate negative scores.

The correlation of months of deviation + 50 with sociometric scores was .29, as shown in Table 1, and the relationship is plotted in Figure 3. An almost straight line connects the mean sociometric scores below the median age and is reflected in the coefficient of .48 obtained between the two measures for the 88 Ss seven months or more younger than the median age of the club. This coefficient differs significantly from the *r* of .07 obtained for the 91 Ss with no more than six months difference in age from the median of the club, and from the *r* of .04 obtained for the 91 Ss seven months or more older than the median age of the club. The regression



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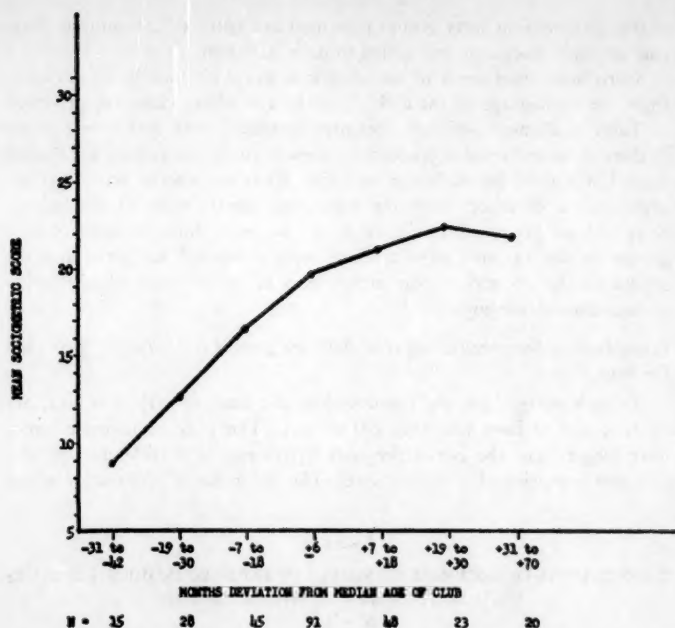


FIGURE 3—Relation of sociometric scores of Home Economics Ss to age deviations from the median age of the club.

equation fitted by the least squares method for predicting sociometric score ( $Y$ ) from the minus seven or more months of deviation  $+ 50$  score ( $X$ ) is:  $Y = .989X + (-16.66)$ .

The null hypothesis was rejected at the .001 level for the mean sociometric scores of these three groups in an  $F$  test of a simple randomized analysis of variance (8). The null hypothesis was rejected at the .02 level for the difference in mean sociometric scores of the below median age Ss and the median age Ss, and at the .001 level for the difference in means of below median age Ss and above median age Ss. The null hypothesis could not be rejected for the difference in means of the median age Ss and the above median age Ss.

It is concluded that in these girls' clubs deviations in age below the median age of the club are inversely related to sociometric scores, but deviations in age above the median age of the club do not relate to sociometric scores.

To obtain sociometric scores that were independent of age influences for use with other factors in this investigation, each home economics sociometric score was expressed as a deviation from the mean sociometric score

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of the age deviation array groups presented in Figure 3 (12), and, to eliminate negative scores, 50 was added to each deviation.

Correlation coefficients of sociometric scores with months of deviation from the median age of the club + 50 in agriculture clubs are presented in Table 1. Because both age measures correlated with sociometric scores in these clubs and sex differences were present (to be described), a statistical control was used for both age and sex. Each sociometric score was expressed as a deviation from the mean sociometric score of the age-sex array groups presented in Figure 2 + 50, with three exceptions: the groups in the 13- and 14-year arrays were combined for girls, and the groups in the 15- and 16-year arrays, and in the 17- and 18-year arrays were combined for boys.

*Hypothesis 2. Sociometric status in both sex groups is higher for girls than for boys.*

In agriculture clubs, the mean sociometric score of girls was 20.1,  $SD = 11.0$ , and of boys was 16.7,  $SD = 10.3$ . The girls' sociometric scores were larger than the boys'; the null hypothesis of a difference in this direction was rejected at the .05 level. The difference in sociometric scores

TABLE 2  
CORRELATIONS OF SOCIOMETRIC SCORES IN HOME ECONOMICS 4-H CLUBS  
WITH DICHOTOMIES OF OTHER FACTORS  
 $N = 270$

Dichotomy of Factor	Correlation Index	Sociometric Score	Sociometric Score Corrected for Age Differences
Project rating ..... A (65%)—B or C (32%) (No exhibit—3%)	$r_{bis}$	.43**	.31**
County Project Honor ..... Yes (38%)—No (62%)	$r_{bis}$	.24**	.26**
State Project Honor ..... Yes (20%)—No (80%)	$r_{bis}$	.17**	.26**
Elected an officer of club ..... Yes (40%)—No (60%)	$r_{pt bis}$	.17**	.12
Farm or town residence ..... (in 13 clubs with both) $N_{farm} = 118$ (63%) $N_{town} = 68$ (37%)	$r_{pt bis}$	.04	.03
Difference in school ..... (19 clubs had majority from one school) $N_{same} = 168$ (74%) $N_{different} = 60$ (26%)	$r_{pt bis}$	.08	.02

\*  $r$  is significant at less than the .05 level.

\*\*  $r$  is significant at less than the .01 level.

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occurred in spite of the fact that the girls were younger than the boys and age had a positive relation with sociometric scores for both sexes. The mean age of girls was 12.8 years and the mean age of boys was 13.11 years. The null hypothesis of an age difference in this direction was rejected at the .001 level.

The sex difference in sociometric scores in community youth groups agrees with the hypothesis. The hypothesis specifies sociometric status rather than social acceptance. This distinction is made because an investigation with preschool children (10) found the null hypothesis could not be rejected for sex differences in observed social acceptance, observed social participation, and teacher judgments of social acceptance when the sex difference in sociometric scores was large and significant.

*Hypothesis 3. Level of performance or achievement in the skills and knowledge essential for or being taught to the group is positively related to sociometric status.*

Findings with the 4-H Clubs agree with this hypothesis, as shown in Tables 2 and 3. The home economics project rating correlated beyond

TABLE 3  
CORRELATIONS OF SOCIOMETRIC SCORES IN AGRICULTURE CLUBS  
WITH CLASSES OF OTHER FACTORS

Classes of Factors	Correlation Index	SOCIOMETRIC SCORES			
		Boys N = 87	Girls N = 47	Total N = 134	Corrected for Age and Sex, N = 134
Project rating ..... (of 103 Ss exhibiting project) A (50%)—B (37.5%)— C or less (12.5%)	$r_{\text{tris}}$	.03	.13	.01	.04
County Project Honor .... Yes (18%)—No (82%)	$r_{\text{pt bis}}$	.25*	.28	.28**	.23**
State Project Honor ..... Yes (8%)—No (92%)	$r_{\text{pt bis}}$	.30**	.31*	.30**	.26**
Elected an officer of club ... Yes (22%)—No (78%)	$r_{\text{pt bis}}$	.31**	.21	.27**	.16
Farm or town residence ... (in five clubs with both) N farm = 80 (84%) N town = 14 (16%)	$r_{\text{pt bis}}$	..	..	.14	.11
Difference in school ..... (four clubs had majority from one school) N same = 49 (63%) N different = 29 (37%)	$r_{\text{pt bis}}$	.04	.10	.08	.07

\* $r$  is significant at less than the .05 level.

\*\* $r$  is significant at less than the .01 level.

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chance with sociometric status while the similar agriculture rating, described as a non-performance measure, did not do so. In both club samples the county and state project honor evaluations had significant correlations project honor evaluation, this hypothesis would have predicted correlations with sociometric scores. Knowledge of the judges' rating or evaluation could not have affected these relations since sociometric tests were administered prior to these county competitions.

### *Hypothesis 4. Leadership is positively related to sociometric status.*

This hypothesis did not predict correlations between election to club office and sociometric scores when the effects of age were controlled in these community youth groups, as shown in Tables 2 and 3. Significant correlations were obtained only when the positive relation of age to sociometric scores (and possibly election to office) was uncontrolled. This finding cannot be attributed to the particular county; a relationship was found to exist for the elected leaders in women's clubs in the same communities and county (13). It is possible that election to club office has a different meaning (relation to other variables) in developmental years than in adulthood. Possibly, also, peer nominations of leaders on near-sociometric tests may not resemble elections of leaders. If leadership had been defined as the for these groups. As stated in the description of measures, the project honor definition is comparable to definitions used in many investigations reporting this hypothesis as a research conclusion.

### *Hypothesis 5. Family and community variables may relate to social acceptance in particular groups.*

The dichotomies of farm-town residence and of attendance at the same or different schools were not associated with social acceptance in these community youth groups, as shown by correlations in Tables 2 and 3.

### *Hypothesis 6. Sociometric status in one group has a positive and fairly high correlation (.50-.60) with sociometric status in groups of different membership.*

The 33 Ss who were members of both types of clubs had a below average mean score, 16.1,  $SD = 8.8$ , in home economics clubs and an above average mean score, 20.1,  $SD = 12.5$ , in agriculture clubs. The respective age and age-sex corrected mean scores were 46.9 and 50.6. The hypothesis of no difference in these means was rejected at the .05 level in a one-tailed test for both the original and corrected scores. The product-moment correlation coefficient was .62 between the two sociometric scores, and was .49 between the sociometric scores corrected for age or for age-sex differences.

The correlation coefficients between sociometric scores in the county camp group and club were .55 for both the 13 girls and all 15 Ss. When the club score corrected for age or age-sex differences was correlated with the camp sociometric score, coefficients were .38 for the 13 girls and .42

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for all 15 Ss. The reduction in size of the latter two coefficients suggests that age differences probably were associated with camp group sociometric scores also. Campers' ages were restricted to 10 to 14 years. Club sociometric score means were 17.8 and 18.5 for the 13 and 15 Ss respectively, and camp sociometric score means were 18.3 and 18.0 respectively.

It may be concluded that findings for these community youth groups are in agreement with hypothesis 6. It may be hypothesized additionally, through use of the  $r^2$  as percentage explanation, that 64 to 75 per cent of the variance in sociometric scores is due to factors associated with the membership of different groups, such as the other five factors investigated here.

## SUMMARY AND CONCLUSIONS

This investigation proposed to test the prediction for community youth groups of six hypotheses concerned with factors affecting sociometric acceptance and developed inductively from research conclusions. Ss were 270 girls in 23 Home Economics 4-H Clubs and 87 boys and 47 girls in eight Agriculture 4-H Clubs in the same county.

Four hypotheses predicted the relations found in these groups: (a) In child or youth groups, age has a positive, low correlation (.15-.20) with sociometric status. (b) Sociometric status in both sex groups is higher for girls than for boys. (c) Level of performance or achievement in the skills and knowledge essential for or being taught to the group is positively related to sociometric status. (d) Sociometric status in one group has a positive and fairly high correlation (.50-.60) with sociometric status in groups of different membership. One nonpredictive hypothesis specified a positive relation with leadership, defined here as election to club office. The other stated that family and community variables, defined here as farm or town residence and attendance at the same or different schools, may relate to social acceptance in particular groups.

Analyses of age differences indicated that in the girls' clubs deviations in age below the median age of the club were inversely related to sociometric scores, but deviations in age above the median age of the club did not relate to sociometric scores.

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## DISCRIMINATION LEARNING IN CHILDREN AS A FUNCTION OF REINFORCEMENT VALUE

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The present study is concerned with the influence of reinforcement *value* on learning. Reinforcement *value* is defined as the individual S's relative preference for various types of reinforcers, when amount of reinforcement and probability of occurrence of reinforcement are held constant.<sup>2</sup>

The results of several studies show that, on the average, different types of reinforcers are differentially effective for learning (1, 5). For example, Terrell and Kennedy found that children learn faster when rewarded with candy rather than with praise (5). However, despite the fact that children as a *group* learn more effectively on candy reinforcement, it is hardly conceivable that any one type and amount of reinforcement has an exactly equal reinforcing effect for all Ss of any such group. Given one group of Ss and one type of reinforcement, there must still be some intragroup variability in effectiveness of that reinforcement as a function of variability in value of the reinforcer for the Ss. In other words, for different people, the same objective or external reinforcer may have different reinforcement values, and if so, the within-group variability in reinforcement value should be reflected statistically as a large standard deviation in number of trials to learning criterion.

The present experiment used a discrimination learning situation to compare the relative effects of two experimental treatments: identity of reinforcement *value* vs. identity of external reinforcing object. Ss run under the first condition (group RV) were allowed to choose the most preferred one of three reinforcers: M & M candies, varicolored marbles, or varicolored plastic trinkets. Ss of the second experimental group (group R) were

<sup>1</sup> The authors wish to express their thanks and gratitude for the cooperation and assistance received from the following persons: Neal Royer, Superintendent, Campbell Elementary School District; Peter Fransich, School Psychologist; Duane Beaubien, Principal, Dover School; and Wayne Fontes, Principal, Hamilton School.

<sup>2</sup> From a conceptual point of view, *reinforcement value* might be considered as roughly analogous to *incentive motivation* (K), insofar as the latter intervening variable is used to account for performance differential as a function of differences in quality of reinforcement (3). There are operational differences, however, since the present procedure does not involve a consummatory response, the classical conditioning of which is assumed to be the basic mechanism underlying incentive motivation.



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reinforced with candies. It was predicted that although there would be no significant mean difference between the two treatment groups in trials to criterion, group RV would show greater within-group homogeneity than group R, i.e., there would be a significantly smaller standard deviation for group RV.

Candy was used as the standard reinforcer for group R in order to make the experimental comparison a conservative one. The reasoning behind this was as follows: First, from a logical consideration, it would seem that if sigma were to vary in size at all with differences in *average* reinforcement value, it should be smallest for that reinforcer having the highest average value (and hence, the greatest facilitating effect on learning). [See, for instance, the relative sizes of standard deviations in Terrell and Kennedy's Table 1, (5, p. 259).] Second, from a statistical consideration, if means and standard deviations are positively correlated in size, that treatment producing lowest mean number of trials to criterion should also show the smallest standard deviation.

## METHOD

### *Subjects*

The Ss were 60 male children. They were obtained from the eight kindergarten classes of two elementary schools within a single school district. Mean age of Ss was 63.6 months, *SD*, 3.4. The sample was relatively homogeneous in terms of race (white) and socioeconomic status (middle class). Mean California Mental Maturity Scale IQs for second graders at each school was 106. Goodenough Draw-A-Man tests were available for all kindergartners, and were used in the selection process to eliminate potential Ss of subnormal intelligence, as follows: The school psychologist submitted a list of names of children with extremely low scores on the Goodenough test. A short-form WISC was then administered to these 17 children. Using a cutting score of 70 IQ, eight of the 17 were eliminated from the total pool from which Ss were drawn.

Selection of Ss and placement into one of the two experimental groups was in alphabetical order. In order to have the total RV group composed of equal numbers of Ss preferring each of the three reinforcers, a quota was established of 10 Ss per type of reinforcer. This quota imposed no practical difficulties, since, on the average, the three reinforcers were approximately equal in attractiveness. Only two potential Ss were discarded because they chose a reinforcer (trinkets) for which the quota had already been reached.

### *Experimental Procedure*

S was seated opposite E, at a small table on which were three boxes, the discriminative stimuli. The boxes were of different colors (dark red, light red, and red-orange). Two boxes, No. 1 and No. 2, were the same



size but different in size from the third box.<sup>3</sup> Color and size, however, were irrelevant cues, as was also the presence of box No. 3, since the correct response was a simple position alternation sequence of the reinforcement between boxes No. 1 and No. 2. For presentation, the boxes lay open side down on a large piece of brown felt approximately four inches distant from each other; the end boxes, No. 1 and No. 3, were equidistant from S. Position of the boxes was constant for all trials.

On a second table, to S's right, lay a small pillow on which S rested his head between trials. This served two purposes: (a) it eliminated the necessity of placing a screen in front of S while E reloaded the boxes, and (b) it reduced sound localization in the event of any auditory cues during reloading.

As soon as S entered the experimental room, E gave the following instructions:

(group R) Do you know what these are? (E paused and indicated an open box of M & M candies.) They're candy; they're chocolate. I have something very special for you to do, and if you can do it you can have some of the candy.

(group RV) Here are some marbles; here are some charms; here are some candies. (E paused and indicated the appropriate boxes; placement and naming order were rotated by Ss.) Now I have something very special for you to do, and if you can do it you can have some of the charms OR some of the candies OR some of the marbles. You can't have some of all of them, just some of one kind. Now THINK HARD: if you could have JUST ONE KIND, which kind would you rather have—would you rather have some candies OR would you rather have some charms OR would you rather have some marbles?

(Both groups) I'm going to put one — at a time under one of these boxes. And every time you pick up the box that has the — under it, you can keep the —. Understand? Now! THERE IS A WAY TO FIND THE RIGHT BOX EVERY SINGLE TIME. SEE IF YOU CAN FIND THE WAY.

Put your head down on that pillow and wait until I say "ready." . . . Ready. Pick up the box that you think has the — under it. . . . Now every time you get a —, pick it up and put it in this envelope, and all the — that you put in there will be for you to keep. . . . Head down. . . . Ready.

(After the last trial, the following statement was repeated until S indicated agreement. The purpose of the statement was to "jam" inter-S communication.)

Well, you found the way, didn't you? You found out that the candy was always under the RED box. (E indicated simultaneously all boxes.) Yes, the candy was always under the RED box.

<sup>3</sup> The boxes were of ordinary heavy cardboard construction. Box No. 1 measured  $4\frac{3}{4}$  by  $3\frac{1}{2}$  by  $1\frac{1}{8}$  in., and was painted with a mixture of 2 parts red Dope to 1 part white Dope. Box No. 2 had the same dimensions as Box No. 1, and was painted with a mixture of 1 part red Dope to 2 parts white Dope. Box No. 3 measured  $3\frac{1}{2}$  by  $2\frac{3}{4}$  by  $1\frac{1}{8}$  in., and was painted with orange Dope.

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Two learning criteria were used: (a) number of trials taken before *S* no longer chose the irrelevant or never-reinforced box No. 3; and (b) the number of trials taken to a run of 10 consecutive correct choices. An experimental session ended either when *S* reached the second criterion or after the 150th trial. In the latter case, the score assignment was 150. Session length ranged from 10 to 25 minutes per *S*, depending upon time taken to reach the second criterion.

TABLE I  
MEANS AND VARIANCE ESTIMATES FOR DISCRIMINATION  
LEARNING CRITERIA

	First Criterion: number of trials to eliminate irrelevant box		Second Criterion: number of trials to and including 10 consecutive correct responses	
	GROUP		GROUP	
	R	RV	R	RV
<i>N</i> .....	30	30	30	30
<i>M</i> .....	58.30	43.57	72.47	60.97
$\sigma_{DM}$ .....		11.15		10.55
<i>t</i> .....		1.32		1.09
<i>p</i> .....		.19		.27
$\sigma^2$ .....	2503.96	1351.25	2283.13	1167.34
<i>F</i> .....		1.85		1.96
<i>p</i> .....		.05*		.05*

\* One-tailed test.

## RESULTS

Table I shows the means and standard deviations for both groups on both learning criteria. As predicted, there were negligible differences between means and relatively large differences between standard deviations. That is, on both measures, the RV group showed significantly less variability than did the R group. Although the evidence is by no means overwhelming in support of the hypothesis, it ought to be pointed out that the experimental comparison was a conservative one in two ways. The first—the use of a high average value reinforcer for group R—was mentioned above. Second, the true variability was underestimated by assigning to nonlearners the limiting score of 150. This restriction worked against the hypothesis since there was a disproportionately larger number of nonlearners in group R than in group RV (six as compared to one).

The correlation between CA and number of trials to the second criterion was  $-.12$ . The insignificant size of this correlation is no doubt

attributable to restriction of age range in the sample. Last, there was no significant difference in mean performance between the 10 candy reinforced Ss of group RV and the 30 candy reinforced Ss of group R.

#### DISCUSSION

The results of the present study are relevant to some common methodological problems. First, an experimenter who employs a simple analysis of variance design, using children as Ss frequently finds that between-group differences are large, but that the size of the within-group variability is even more impressive. The present findings suggest that the use of individually determined reinforcers will reduce such error variance.

Second, experimenters working with young children often report some difficulty in maintaining sufficient motivation to ensure Ss' cooperation or even to keep them in the experimental room. The method of allowing S to choose that reinforcer he would most like to work for probably maximizes motivation as a function of high incentive value.

A third methodological problem concerns the fact that the effectiveness of any given type of reinforcer varies with age. For example, Sturgis (4) has reported that trinkets are not effective reinforcers at age 2½, but are effective at age 4. What is needed, then, is a "methodological cookbook" of normative data, listing relative effectiveness of all possible reinforcers by successive age levels. But this information is not available, except for the limited data provided by Terrell and Kennedy. At present, selection of the most effective reinforcer for a given problem and age group depends on a good guess or a pilot study. The present results suggest that it would be less hazardous and/or time-consuming to hold reinforcement value constant for any experimental group rather than reinforcement type, i.e., to offer Ss a selection of reinforcers.

The above data may also lend themselves to practical application. For example, in the classroom situation, teachers depend principally on one type of reinforcement—the grade. However, grades are not equal in reinforcement value for all students. In view of this, teachers might obtain better academic results from their poorer students by offering other, individually determined, incentives. As an incidental note, one of the authors has tried informal remedial training with a few children deficient in either arithmetic or reading. In all cases, the under-achievement appeared to be a function of insufficient motivation, not of inability. Rapid improvement was noted when the procedure included (a) reinforcement with individually determined reinforcers, and (b) a combined reward-punishment technique (2).

#### SUMMARY

A comparison was made of the relative effects on discrimination learning of two experimental treatments: identity of reinforcement value vs.

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identity of external reinforcing object. Reinforcement value was defined as *S*'s relative preference for various types of reinforcers, with amount of reinforcement and probability of occurrence of reinforcement held constant. Results supported the expectation that, although the two groups would not differ in mean trials to criterion, the reinforcement value group would show significantly less variability in trials to criterion.

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## NURTURANCE AND NURTURANCE-WITHDRAWAL IN RELATION TO THE DEPENDENCY BEHAVIOR OF PRESCHOOL CHILDREN<sup>1</sup>

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This investigation is based on the hypothesis that non-nurturance by an adult is more strongly associated with the occurrence of dependency behavior in young children than is nurturance alone. The naturalistic studies of Sears *et al.* (11), Beller (1), and Smith (12) all contain data which show a positive relationship between amount of parental frustrations (non-nurturance) and the frequency of dependency behavior observed in young children. Similar results were obtained in the laboratory studies of Gewirtz (5, 6, 7), although Carl's laboratory findings with respect to this hypothesis were inconclusive (2).

The present study was designed to explore the relationship between one specific form of non-nurturance—the withdrawal of nurturance—and young children's acquisition of responses which elicit adult approval. This relationship was studied in the laboratory where some manipulation of the relevant antecedent conditions was possible.

The method of this study has been to provide a comparison in the learning of simple responses which elicit adult approval between a group of children consistently nurtured by an experimenter and another group who were nurtured and then rebuffed (nurturance-withdrawal). It was predicted that children in the presence of an adult female experimenter who withdraws her nurturance in this fashion will learn simple tasks eliciting adult approval in fewer trials and with fewer errors than children

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<sup>1</sup> This study is based on a doctoral dissertation submitted by the author to the Graduate School of Education of Harvard University. Parts of this investigation were reported at the 1956 meetings of the American Psychological Association in Chicago, Illinois. The author wishes to acknowledge the helpful criticisms of Dr. Harry Levin in the preparation of this study.

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in the presence of an experimenter who has been consistently nurturant. This prediction is based, in part, on those aspects of psychoanalytic theory which suggest that attempts by the child to institute closeness and seek affection are most strongly related to the anxiety generated at times of separation from the mother or when the child has experienced loss of the mother's love (4). It is believed that the withdrawal of nurturance by a female experimenter is similar to certain aspects of the caretaker-child relationship. If so, such behavior by the experimenter should generate certain amounts of anxiety in young children which, in turn, should motivate dependency behavior.

Certain aspects of behavior theory are also relevant to the present prediction. Miller (9) and Mowrer (10) suggest that the capacity of a neutral stimulus to evoke anxiety is strengthened through association with increases in drive or delay in primary reinforcement; presumably it is association such as this which results in children becoming anxious when the mother is absent or non-nurturant. If children in our culture commonly do learn to respond in this way to the non-nurturance of adults, if anxiety does motivate behavior, and if adult nurturance has acquired the capacity to reduce anxiety and thereby reinforce behavior for the young child, the experimental prediction formulated for this investigation can be made.

## METHOD

### *Subjects*

Subjects used in this investigation were 34 preschool children—15 boys and 19 girls—in attendance at the Harvard University Preschool during the spring of 1954. The subjects ranged in age from three years, ten months, to five years, six months. The mean age of the children in the sample was four years, seven months; the standard deviation was 4.7 months. The preschool population at the time of the experiment was typical of many laboratory nursery schools in that the children were all from academic, professional, or business homes, and were free from severe emotional disturbances and physical handicaps. Two subgroups were drawn from this sample. These subgroups were counterbalanced with respect to sex of child and dependency ratings made by the preschool teachers on scales of the type used by Beller (1). Two young women served as experimenters.<sup>2</sup> Each experimenter worked with a randomly-assigned half of the subjects in each group.

### *Procedure*

Each child was brought individually to the laboratory room for the experimental session. This room was equipped with one-way mirrors for observation and was furnished with a child's table and chairs, an adult-

<sup>2</sup> The author wishes to thank Mrs. Carla F. Berry and Miss Willa Dinwoodie for their assistance in this regard.

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sized table with comfortable chair, and a large bench. The experimental session proceeded as follows:

1. For a period of five minutes, the experimenter interacted nurturantlly with the child while the child played with toys. For purposes of this experiment nurturance consisted of adult behavior which rewarded, encouraged, supported, or showed affection to the child; during this five-minute period the experimenter attempted to maximize these qualities in her behavior toward the child. Children in both experimental groups experienced this period of nurturant interaction with the experimenter.

2. Children in the consistent-nurturance group (hereafter called group C) then immediately experienced a second five-minute period like the first.

3. The second five minutes for the nurturance-withdrawal group (group NW) were marked by the experimenter's behaving non-nurturantlly toward the child. She ceased to interact with the child, withdrew from his proximity, and did not reward any of the child's supplications beyond telling him that she was "busy." The experience of children in group NW, having first a period of nurturant interaction, then a period of non-nurturance from the experimenter, has been called "nurturance-withdrawal."

4. Children in both experimental groups were then asked by the experimenter to learn two tasks, the reward for which was the verbal approval of the experimenter. Task I consisted of learning a simple *position* concept in an arrangement of two blue and two red one-inch blocks. The task was presented to the child as a guessing game. The experimenter placed the blocks on the floor first in this order (reading from the child's left): red, red, blue, blue. She then said: "I'm thinking of one of the blocks and I want to see if you can guess which one it is. Point with your finger to the one you think is right and I'll tell you if it's the right one." The child's first guess was always unsuccessful, as was his second. The third guess was always successful. This introductory procedure was followed to eliminate chance successes on the first guess. On each succeeding trial the arrangement of the blocks was changed through all the possible order-permutations. The correct block was always the block in the same position in the row as the one which the child chose on his third guess. The performance criterion was three consecutive correct trials. Task II consisted of copying from memory a row of adjacent blue, red, and yellow one-inch cubes which were shown to the child for five seconds per trial. Six blocks were arranged in the following order: red, yellow, blue, blue, yellow, red. The performance criterion was one perfect reproduction of the arrangement completed by the child from his own supply of blocks. Measures used in the subsequent analysis of the data were: (a) number of errors to criterion on task I; (b) number of trials to criterion on task I; (c) number of errors to criterion on task II; (d) number of trials to criterion on task II. Error- and trial-scores were correlated .93 on task I, .96 on task II.

Measures of the child's tendency to be dependent on adults were from three sources: (a) observation during the period of nurturant interaction

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in the laboratory; (b) ratings of the child's dependency on adults made by the preschool teachers; and (c) observations of the child's dependency on adults in preschool made by observers.

Behavior categories used for the laboratory observations were as follows:

1. Asks for verbal help and information
2. Asks for material help
3. Seeks reassurance and rewards
4. Seeks positive attention
5. Seeks to be near
6. Seeks physical contact
7. Seeks negative attention
8. Initiates verbal interaction with experimenter

Frequencies in categories 1 through 7 were summed to yield a measure of dependence on the experimenter. Category 8, "verbal interaction," was used independently in the analysis of data.

The following seven-point scales were used for the teacher ratings of the child's dependence on adults in the preschool situation:

1. Seeks recognition
2. Seeks unnecessary help
3. Seeks necessary help
4. Seeks physical contact and proximity
5. Seeks attention

Each child was rated by two of his teachers (reliability coefficients ranged between .73 and .99). The ratings of the two teachers on each scale were pooled; a summary rating score was then obtained by summing the pooled ratings on all five scales. This summary rating score was used to counterbalance the two subgroups as described above and was also used in analyzing the learning scores.

Behavior categories used for the preschool observations of dependency on the teacher were:

1. Seeks recognition and approval
2. Seeks unnecessary help
3. Seeks necessary help
4. Seeks physical contact
5. Seeks to be near
6. Seeks positive attention
7. Seeks negative attention

Frequencies in the seven categories were summed to yield the preschool observation measure of dependence on the teacher which was used in the statistical analysis.

The intercorrelations among the two laboratory scores, the summary teacher rating, and the preschool observation total score are reported in Table 1.



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TABLE 1

INTERCORRELATIONS AMONG FOUR MEASURES OF DEPENDENCY ( $N = 34$ )

	1	2	3	4
1. Verbal interaction with experimenter: laboratory . . . .	—			
2. Dependence on experimenter: laboratory . . . . .	.13	—		
3. Dependence on preschool teacher: teacher rating . . . .	.03	.40*	—	
4. Dependence on preschool teacher: observer score . . . .	.00	.11	.31	—

\* Significant beyond .05 level.

The data from the learning tasks were studied by a triple-classification analysis of variance technique for unequal cell-entries (13). The three independent variables in this analysis were (a) sex of child; (b) dependency scores as described above and by which the group was separated into two subgroups—high dependency (all cases above the median on the score being used) and low dependency (all cases below the median); (c) experimental treatment, consistent nurturance versus nurturance-withdrawal. Four analyses of variance were completed for each trial- or error-score from the learning tasks: one for each summary dependency score described above. The results of these analyses are summarized in the tables which follow.

TABLE 2

F RATIOS FROM FOUR ANALYSES OF VARIANCE BASED ON NUMBER OF TRIALS ON TASK 1 ACCORDING TO SEX OF CHILD, DEPENDENCE, AND EXPERIMENTAL CONDITION

Source	Analysis 1* ( $N=27$ )	Analysis 2* ( $N=33$ )	Analysis 3* ( $N=32$ )	Analysis 4* ( $N=31$ )
Sex of Child . . . . .	16.153 <sup>‡</sup>	2.618	3.988	2.953
Dependence . . . . .	7.163 <sup>†</sup>	.002	.527	6.571 <sup>†</sup>
Experimental Condition . . . . .	13.859 <sup>‡</sup>	4.574 <sup>†</sup>	1.759	1.438
Sex × Dependence . . . . .	3.053	3.630	.028	.015
Sex × Condition . . . . .	6.744 <sup>†</sup>	2.098	3.549	6.437
Dependence × Condition . . . . .	2.224	.792	2.249	1.488
Sex × Dependence × Condition . .	.215	.570	.005	1.186

\* The measures of dependence used were: analysis 1, frequency of verbal interaction initiated by child in the laboratory session; analysis 2, frequency of dependence on adults observed in the laboratory session; analysis 3, teachers' ratings of dependence; analysis 4, dependence on preschool teachers as recorded by observers.

<sup>†</sup> Significant between .05 and .01.

<sup>‡</sup> Significant between .01 and .001.

<sup>§</sup> Significant beyond .001.

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## RESULTS

*Task I—Number of Trials*

Table 2 shows that the *F* ratio for the experimental variable was significant beyond the .01 level in analysis 1 and beyond the .05 level in analysis 2. The means for groups C and NW are reported in Table 3 along with the *t* ratio for the difference between means. These data show that NW children (who had experienced nurturance-withdrawal) took fewer trials to complete the task than C children (who had experienced consistent nurturance). Table 2 also shows that in two analyses there was a significant interaction between experimental condition and the sex of child. This interaction may be interpreted to indicate that the effects of nurturance-withdrawal by a female adult are dependent on the sex of the child. The data reported in Table 3 show more clearly the effects of this interaction: nurturance-withdrawal was clearly associated with faster learning of the task for girls, but there was no difference between the means for boys in group C and in group NW.

TABLE 3  
MEAN NUMBER OF TRIALS ON TASK I FOR BOYS AND GIRLS  
IN TWO EXPERIMENTAL GROUPS

	Group C	N	Group NW	N	<i>t</i>	<i>p</i>
Boys .....	15.86	7	16.14	7	..	n.s.
Girls .....	35.22	9	16.10	10	2.570	.02 > <i>p</i> > .01
Boys and Girls ....	26.77	16	16.11	17	2.041	.05 > <i>p</i> > .01

The *F* ratio for sex of child was significant in one of the analyses reported in Table 2, and the direction of mean differences showed that boys as a group learned the task in fewer trials than girls. This difference is believed to relate to some feature of the task itself rather than the social conditions of the experiment since the same difference was not found in the data for task II; however, the aspect of task I producing the sex difference was not clear from observation of the children in the experiment. The dependency variable was also significant in two analyses; subgroup means showed that the more dependent children (as measured by verbal interaction) learned task I more quickly than the less dependent children, but that more dependent children (as measured by preschool observation) learned task I less quickly than the less dependent children.

*Task I—Number of Errors*

Since the error-measure was highly correlated with the trials-measure on task I similar results would be expected and were obtained from the analyses of variance. *F* ratios for the experimental variable were significant in analyses 1 and 2 (Table 4). Again, significant interaction between sex

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TABLE 4

F RATIOS FROM FOUR ANALYSES OF VARIANCE BASED ON NUMBER OF ERRORS ON TASK I ACCORDING TO SEX OF CHILD, DEPENDENCE, AND EXPERIMENTAL CONDITION\*

Source	Analysis 1* (N=27)	Analysis 2* (N=33)	Analysis 3* (N=32)	Analysis 4* (N=31)
Sex of Child .....	9.421‡	1.360	2.581	1.385
Dependence .....	5.060†	.190	1.050	6.577†
Experimental Condition .....	10.519‡	4.640†	1.232	.924
Sex × Dependence .....	1.943	4.063	.003	.532
Sex × Condition .....	4.267	1.560	3.262	6.118†
Dependence × Condition .....	2.458	1.364	1.610	.772
Sex × Dependence × Condition ..	.074	1.219	.003	1.414

\* The measures of dependence used were: analysis 1, frequency of verbal interaction initiated by child in the laboratory session; analysis 2, frequency of dependence on adults observed in the laboratory session; analysis 3, teachers' ratings of dependence; analysis 4, dependence on preschool teachers as recorded by observers.

† Significant between .05 and .01.

‡ Significant between .01 and .001.

of child and experimental condition was found (in analysis 4, Table 4). Table 5 reports the means for the experimental groups according to sex of child, and once more the results show significant differences between the experimental groups for girls but not for boys.

The *F* ratio for sex of child was significant in one analysis indicating that boys learned the task faster than girls. The dependency variable was significant in two analyses, but mean differences were in the same inconsistent directions as in the analysis of trial-scores on task I.

TABLE 5

MEAN NUMBER OF ERRORS ON TASK I FOR BOYS AND GIRLS  
IN TWO EXPERIMENTAL GROUPS

	Group C	N	Group NW	N	<i>t</i>	<i>p</i>
Boys .....	18.14	7	18.71	7	..	n.s.
Girls .....	39.33	9	17.30	10	2.71	.02 > <i>p</i> > .01
Boys and Girls ....	30.06	16	17.88	17	1.90	.10 > <i>p</i> > .05

### Task II—Number of Trials

The distribution of scores on this measure significantly departed from normality; hence the results are not reported here.

### Task II—Number of Errors

The results for errors on task II were consistent with respect to experimental condition with those found on task I, although at a lesser level of

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TABLE 6

F RATIOS FROM FOUR ANALYSES OF VARIANCE BASED ON NUMBER OF ERRORS ON TASK II ACCORDING TO SEX OF CHILD, DEPENDENCE, AND EXPERIMENTAL CONDITION

Source	Analysis 1* (N=24)	Analysis 2* (N=29)	Analysis 3* (N=28)	Analysis 4* (N=28)
Sex of Child .....	.169	1.567	.170	.056
Dependence .....	2.146	.493	5.318†	1.359
Experimental Condition .....	.501	2.788	4.755†	.521
Sex × Dependence .....	2.332	1.691	2.667	.314
Sex × Condition .....	.003	.014	.373	1.682
Dependence × Condition .....	1.155	.037	.311	.167
Sex × Dependence × Condition ..	.263	.048	.376	1.983

\* The measures of dependence used were: analysis 1, frequency of verbal interaction initiated by child in the laboratory session; analysis 2, frequency of dependence on adults observed in the laboratory session; analysis 3, teachers' ratings of dependence; analysis 4, dependence on preschool teachers as recorded by observers.

† Significant between .05 and .01.

significance. Table 6 shows that one *F* ratio for the conditions variable was significant beyond the .05 level.

The mean number of errors on task II made by the two experimental groups are reported in Table 7. These data are consistent with those for task I and suggest that faster learning was produced under the nurturance-withdrawal condition than under a condition of uninterrupted nurturance. No significant interaction effects were discovered in the analyses of variance.

The *F* ratios for sex of child were not significant in these analyses; the dependency variable (when measured by teacher ratings) yielded a significant *F*, and the means suggest that more dependent children learned task II faster than less dependent children.

TABLE 7

MEAN NUMBER OF ERRORS ON TASK II FOR BOYS AND GIRLS IN TWO EXPERIMENTAL GROUPS

	Group C	N	Group NW	N	<i>t</i>	<i>p</i>
Boys .....	12.40	5	6.17	6	1.121	.30 > <i>p</i> > .20
Girls .....	8.33	9	4.44	9	1.420	.20 > <i>p</i> > .10
Boys and Girls ....	9.79	14	5.07	15	1.750	.10 > <i>p</i> > .05

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### DISCUSSION

The findings for girls uniformly support the hypothesis that nurturance-withdrawal is associated with more efficient performance on the learning tasks than consistent nurturance. The results for boys, however, showed that there were no differences between the nurturance-withdrawal and the consistent nurturance groups. Actually, the results for boys were not so clearly negative. When the boys' groups were divided according to the measures of dependence, *highly* dependent boys were found to respond much as the girls while *low* dependent boys responded in the reverse fashion. Thus, highly dependent boys (who may be assumed to be generally anxious concerning their relationships with adults) did learn more efficiently when the experimenter withdrew her nurturance. The boys in the low dependency group who were consistently nurtured learned more efficiently than boys in this group who experienced nurturance-withdrawal. Although the number of cases in these subgroups was small, this trend in the data suggests support for the hypothesis concerning the influence of nurturance-withdrawal for highly dependent boys as well as for the girls.

The fact that the findings for boys were so equivocal is an interesting one for further exploration. It may be that boys respond differently from girls to the nurturance-withdrawal of a *female* experimenter. Psychoanalytic theory regarding Oedipal relationships suggests that the punitiveness of a like-sexed adult should be more threatening to a child than the punitiveness of an opposite-sexed adult. It would be comparatively easy to incorporate sex of experimenter as a variable in a study such as this. However, since the results of this study suggest that nurturance-withdrawal fails to motivate only *low* dependent boys, there may be some sort of complex interaction among experimental conditions which this study failed to bring to light. For example, boys of this age who are not overtly dependent on adults may have moved further than highly dependent boys toward identifying with the male sex role, which in our culture contains certain elements of independence and self-reliance. Boys who *are* highly identified with the male role might well respond with greater anxiety to the mothering nurturance of the experimenter than to the condition in which the experimenter ceases to be attentive and leaves the child alone. If this were the case, most efficient learning would then have taken place in the low dependency boys under conditions of consistent nurturance. The experiment contains no measure of identification by which this interpretation can be checked.

The relationships of sex of child and dependence to speed of learning on the experimental tasks are far from being clear-cut in these data. Boys tended to learn task I faster than girls, but not task II. Dependence, as measured either by verbal interaction in the laboratory session or by teacher ratings, was positively associated with speed of learning; however, dependence as rated by observers in the preschool proved to be negatively asso-

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ciated with speed of learning. The sources of these inconsistencies probably lie in the situational and procedural differences involved in the various measures of dependence; the intercorrelations among the dependency measures suggest that the various measures did *not* measure similar behavioral traits. It does not appear possible, therefore, without further study, to suggest the manner in which motivation to be dependent modifies the effects of nurturance-withdrawal on speed of learning in young children.

The general significance of these findings is felt to be clear and in the direction suggested by the hypothesis tested: nurturance-withdrawal stimulates faster learning than nurturance alone on simple cognitive tasks for girls, and probably also for boys. There may be, however, some second- or third-order interaction between nurturance-withdrawal, sex of child, sex of experimenter, and dependence which influences the behavior of boys under conditions like those of this experiment.

## SUMMARY

Thirty-four four-year-old preschool children were divided into two experimental groups equated on the basis of sex and teachers' ratings of dependence on adults in preschool. Individual subjects in one group (C) were consistently nurtured by a female experimenter during a 10-minute period of interaction, after which two simple tasks were learned by the child. The subjects in the second group (NW) experienced nurturant interaction with the experimenter during only five minutes, then experienced five minutes of non-nurturant response from the experimenter, and finally were asked to learn the tasks. The data were treated by an analysis of variance technique in which learning scores were divided according to sex of child, dependency ratings, and experimental condition.

Children in group NW took fewer trials to learn task I than children in group C. Although the group findings were significant, analysis according to sex of child showed that nurturance-withdrawal was most clearly associated with faster learning in girls. Children in group NW made fewer errors in learning both task I and task II, although these findings were most significant for girls.

It is felt that these results support the hypothesis that nurturance-withdrawal supplies greater motivation than consistent nurturance for children's behavior which is designed to gain the reassurance of adults.

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## TEACHERS' AND PEERS' PERCEPTIONS OF CHILDREN'S SELF-CONCEPTS<sup>1</sup>

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In recent years efforts which have been directed toward achieving a more adequate interpretation of behavior have centered in the development and further refinement of self theory. The growing importance of the self-concept as a construct is particularly evident in those theories which postulate that the individual's perception of himself is the central factor influencing his behavior (6, 7, 11, 13). These formulations suggest that a more adequate interpretation of behavior can be achieved when the observer increases his knowledge of the behavior's perceptual field including his self-concept.

The utilization and further development of this principle has been especially widespread in the areas of counseling and psychotherapy. In numerous researches the self-concept has proved to be an especially promising measure for evaluating changes which occur during therapy (2, 3, 12). The interest of educators, too, has increasingly focused on the self-concept, for it appears to be a valuable tool in the further investigation of psychological factors which influence learning and development (4, 8). Specifically, the self-concept can be used in education (a) as a psychological construct which enables teachers, counselors, parents and others to achieve with training deeper understandings and insights into the behavior and development of children, and (b) as a vital and important aspect of learn-

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ing and development which the school through its educational processes seeks to promote and foster in every child.

An investigation was made of selected factors influencing perceptions of and changes in children's self-concepts in order that the uses of the self-concept in education might be fully ascertained. In addition, the study sought to explore the further implications of this construct for educational practice. This article will report that part of the study which investigated the effects of selected factors on perceptions of children's self-concepts; the second will concern the effects of selected factors on changes in children's self-concepts.

### THE PROBLEM

Specifically, then, the first part of this study investigated the effects on teachers' and peer groups' perceptions of children's self-concepts in the fourth and sixth grades of four factors: (a) social-emotional climate, (b) teacher participation in an in-service child study program, (c) teacher acceptance of self and others, and (d) grade level.

*Self-concept* in this study was defined as those perceptions, beliefs, feelings, attitudes, and values which the individual views as part or characteristic of himself. In this study evidences of teachers' perceptions of and children's expressed self-concepts were obtained by means of a Q-sort, an instrument and technique which requires the subject to make a forced normal distribution of a series of self-referrent statements.

*Social-emotional climate* was defined as the feeling tone or quality of interpersonal feeling created by group interaction. Classroom climate was defined operationally in this study as the ratio of teacher statements categorized as learner-supportive to those categorized as teacher-supportive as determined by Withall's Index (15).

*Participation in child study* was defined as teacher participation for three years in the teacher in-service program in child study sponsored by the Institute for Child Study of the University of Maryland. In the third year of this in-service study program teachers seek a deeper understanding of behavior through making hypotheses of children's self-concepts in the many situations described in their case records on these children.

*Teacher acceptance of self and others* was defined as the attitudes of valuing and concern which a teacher reveals in relation to herself and others in her environment. In this study the results of Reed's Sentence Completion Test (10) were used to identify teacher differences in acceptance of self and others.

### HYPOTHESES OF THE STUDY

The general hypothesis which was tested by the first part of this study is as follows: In their perceptions of children's self-concepts teachers in group-centered climates, those who have completed three years of child study, those who are more accepting of self and others, and those who teach fourth grade will show greater similarity to these children's expressed self-concepts than will, respectively, teachers in teacher-centered climates,

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those who have never participated in child study, those who are less accepting of self and others, and those who teach sixth grade. The general hypothesis for peer groups' perceptions of children's self-concepts is similar except for the variable of grade level where peer groups of sixth grade are favored over those of the fourth grade.

In addition to the general hypotheses stated above the following specific hypotheses were also tested:

1. Teachers' perceptions of children's self-concepts are in general positively and significantly related to these children's expressed self-concepts.
2. Teachers change significantly toward achieving greater correspondence between their perceptions of children's self-concepts and these children's expressed self-concepts.
3. Sixth grade peer groups' perceptions of sixth grade children's self-concepts will be more similar and fourth grade peer groups' perceptions of fourth grade children's self-concepts will be less similar than the expressed self-concepts of the respective sixth and fourth grade children.
4. Peer groups as a whole will show for "less threatening" percepts of children's self-concepts a greater similarity to those children's expressed self-concepts than they will show for "more threatening" percepts of children's self-concepts.

#### THE SAMPLE

A representative sample of eight classrooms in seven elementary schools which are part of a large county school system in Maryland was selected for study. The communities served by these schools are suburban and are predominantly lower middle to upper middle class in socioeconomic level. Classrooms were selected on the basis of their being willing to participate in the research and their being representative of one of the extremes with respect to each of the independent variables: (a) social-emotional climate, group-centered *vs.* teacher-centered; (b) participation in child study, completion of the three-year program in child study *vs.* no participation in program; (c) teacher acceptance of self and others, more acceptance *vs.* less acceptance of self and others; and (d) grade level, fourth *vs.* sixth. The factorial design of this research in which extremes of each of the four independent variables are represented in the eight classrooms of the sample is shown in Figure 1.

So few fourth and sixth grade teachers who had completed three years of child study were available that nearly all of the classrooms taught by these teachers were included in the study. Assessment of the social-emotional climate of these classrooms and others of the sample was made by the investigator and another observer using Withall's Climate Index (15). This instrument contains seven descriptive categories which form a learner-centered to teacher-centered continuum, and the procedure consists of cate-

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		GRADE LEVEL				
		Fourth		Sixth		
CLIMATE	Group-Centered	A More	J More	D Less	L Less	TEACHER ACCEPTANCE OF SELF AND OTHERS  More Less
	Teacher-Centered	B Less	K Less	C More	M More	
		CS	NCS	CS	NCS	CHILD STUDY PARTICIPATION

FIGURE 1—Factorial design of research showing distribution of differences on four independent variables among the eight classrooms of the sample.

gorizing teacher statements made in classroom interaction. A measure of classroom climate is obtained by contrasting the proportion of statements categorized as learner-supportive (group-centered) with the proportion categorized as teacher-supportive (teacher-centered). The objectivity of the investigator's use of the Climate Index was established by his obtaining a mean agreement of 88 per cent with a second observer for independent categorizations of the same statements of teachers in two classrooms. A reassessment of classroom climate using the Climate Index near the end of the study showed that the climate in these classrooms had remained stable except for one classroom which had had a change in teachers near the end of the study.

Teachers of classrooms in the sample were designed as "more" or "less" acceptant of self and others in accordance with the scores each made on Reed's Sentence Completion Test (10) which measures teacher acceptance of self and others. The four teachers making the highest scores on Reed's test were judged to be more acceptant and the four teachers with low scores were judged to be less acceptant of self and others. In scoring the test the mean percentage of agreement between the investigator and a colleague who had had considerable experience in using and scoring the test was 82 per cent.

The eight teachers of the sample varied in teaching experience from 3 to 33 years and in education from those having no college degree to one with a master's degree. A previous study suggests that these differences in teaching experience and professional training are not factors which would influence significantly the results of this study. Kindred (5) found that in their use of human development principles teachers with additional graduate hours were not significantly different from teachers with less education. This was true also for teachers who differed with respect to number of years' teaching experience.

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### DEVELOPMENT OF INSTRUMENTS

The principal instrument used in this research to study children's self-concepts and teachers' perceptions of children's self-concepts was the Q-sort. The Q-sort, a part of the Q-technique developed by Stephenson (14), is a method of gathering and scoring items for purposes of correlating people instead of tests.

The Q-sort developed for use in this study was a stratified random sample of 50 self-referrent statements, selected from a universe of statements which had been derived from responses of fourth and sixth grade children reported in a survey by Jersild (4). This investigator used the items and subpoints listed under each of Jersild's categories to develop self-referrent statements using language which he believed would be generally characteristic of fourth and sixth grade children. The following 50-item Q-sort was constructed by selecting at random from each category the number of self-referrent statements that corresponded with the frequency of self-percepts that were mentioned in that category by fourth and sixth grade children in Jersild's study.

1. I look on the bright side of things.
2. I understand the kind of a person I am.
3. I am a fast runner.
4. I am not neat.
5. I can take a joke on myself.
6. I cannot talk well in front of a group.
7. I join in doing what the group is doing.
8. I am a leader.
9. My clothes are different than the kind other people wear.
10. I do not like to make things.
11. I keep working until my work is finished.
12. I don't like arithmetic.
13. I don't like animals.
14. I get excited and upset easily.
15. Other people want me to tell them what to do.
16. I draw pictures.
17. I am unpopular.
18. I feel money is very important.
19. I am good in my school work.
20. I can jump well.
21. I can't seem to keep my mind on school work.
22. I have nice hair.
23. I am shy.
24. I do not like school.
25. I have poor health.
26. I do not have a good figure.
27. I have lots of energy.
28. I am not a good sport.
29. I have a brother or sister that I don't like.
30. I am good looking.
31. I am hurt by criticism.

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32. I cannot throw a ball well.
33. I dress so people will notice me.
34. I like reading.
35. I can take things apart and put them together again.
36. I wear bright colors.
37. My parents let me decide things for myself.
38. I like my parents.
39. I am clumsy.
40. I am weak.
41. I cannot make up my mind.
42. My parents expect too much of me.
43. I get places on time.
44. I am tall.
45. I do not like active games.
46. I am afraid to take chances.
47. I have confidence in my own abilities.
48. I watch and listen to TV and radio.
49. I take part in class discussions.
50. I am an unhappy person.

The reliability of the Q-sort for its use with children was ascertained by the test-retest method using all subjects. The Q-sort was found to have a reliability coefficient of .65, which was considered acceptable for the purposes of this study. Comparing the Q-sort results with those obtained by an external measure of self-concept produced a mean percentage of agreement of 70 per cent, indicating that the Q-sort is a valid instrument for studying the self-concepts of children in groups.

A sociometric questionnaire was developed and used to obtain peer groups' perceptions of children's self-concepts. Twenty-five self-referent statements taken from the 50-item Q-sort were phrased as questions, e.g. "Which children seem to look on the bright side of things?" Children were asked to write down the names of as many as four classmates in response to each of the questions.

## COLLECTION AND ANALYSIS OF DATA

The instruments of the study were administered and data were collected three times during the period of the study, November, 1954, to May, 1955. In each collection of data all children present in each of the eight classrooms completed on successive days the self-sort, the sociometric questionnaire, and the ideal sort. During each collection of data each teacher performed four Q-sorts, sorting the 50 statements as she believed four children whom she felt she knew very well would sort them.

Q-correlations were computed for the teacher's and child's sortings of the Q-sort statements. Fisher's " $r$  to  $z$ " transformation tables were used to convert each correlation to a  $z$  score. Sociometric data were tabulated and grouped in a manner which made it possible to test hypotheses dealing with peer groups' perceptions of children's self-concepts. The 5 per cent

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point of significance was designated as the point at which the null hypothesis was to be rejected.

### FINDINGS

#### *Teachers' Perceptions of Children's Self-Concepts*

Q-correlation coefficients showing the correspondence between the teacher's sorting and the child's sorting of 50 self-referent statements are reported in Table 1 for each of four children in eight classrooms and for each of the three times data were collected. The mean  $r$  for all correlations of teachers' and children's placement of Q-sort items during the three times data were collected was .41. This may be regarded as a fairly high correlation, especially when one notes that the grand mean reliability coefficient of the children in this sample was only .65. Correlations of the teacher's and the child's placement of 50 Q-sort items differ significantly from zero at the 5 per cent level when  $r = .279$  and at the 1 per cent level when  $r = .361$ . Examination of the data in Table 1 indicates that all teachers had coefficients of correspondence above the 1 per cent level for at least one child. Of the 96 performances of the Q-sort by the eight teachers, 61 resulted in correlation coefficients above .36. A sign test indicates that this result is significant at the 1 per cent level. These findings, then, tend to sustain hypothesis number one, for they show that teachers' perceptions of children's self-concepts are in general positively and significantly related to these children's expressed self-concepts.

The  $z$  scores of the Q-correlations reported in Table 1 were also tested by analysis of variance to determine whether groups of teachers who represented differences in social-emotional climate, participation in child study, teacher acceptance of self and others, and grade level differed significantly in the correspondence between their perceptions of children's self-concepts and these children's expressed self-concepts. In addition, the analysis of variance revealed whether the correspondence differed significantly for the three times data were collected or for each of the four children.  $F$  ratios and probabilities obtained from the analysis of variance are reported in Table 2.

Results of the analysis of variance show that teachers who have completed three years of child study achieve significantly greater correspondence between their perceptions of children's self-concepts and these children's expressed self-concepts than do teachers who have never participated in child study. This finding, significant at the 2 per cent level, is consistent with the hypothesized prediction favoring teachers who have participated in child study.

The analysis of variance showed, too, that sixth grade teachers and teachers who are "less" accepting of self and others register significantly greater correspondence between their perceptions of and children's expressed self-concepts than do, respectively, fourth grade teachers and

TABLE I

Q CORRELATION COEFFICIENTS AND  $r$  OF Mean  $z$  FOR TEACHER'S  
SELF-SORT ON CHILD VS. CHILD'S SELF-SORT

Child	Child's Reliability Coefficient	I Dec. Q	II Feb. Q	III May Q	Corresponding $r$ of Mean $z$
<i>Teacher A: 4th—CS—GC—More</i>					
A 6	.42	.03	.46	.54	.36
A 19	.76	.14	-.06	.12	.07
A 29	.84	.51	.55	.62	.56
A 31	.67	.17	.04	.21	.14
Corresponding $r$ of Mean $z$		.22	.27	.40	.30
<i>Teacher B: 4th—CS—TC—Less</i>					
B 2	.12	.53	.36	-.03	.30
B 9	.82	.59	.51	.07	.41
B 26	.52	.45	.47	.40	.44
B 29	.75	.39	.45	.45	.43
Corresponding $r$ of Mean $z$		.49	.45	.23	.40
<i>Teacher C: 6th—CS—TC—More</i>					
C 4	.35	.52	.40	.54	.49
C 10	.74	.48	.42	.52	.47
C 26	.88	.51	.31	.40	.41
C 29	.68	.62	.46	.46	.54
Corresponding $r$ of Mean $z$		.54	.40	.48	.48
<i>Teacher D: 6th—CS—GC—Less</i>					
D 3	.79	.60	.50	.70	.61
D 10	.62	.48	.65	.72	.63
D 40	.65	.53	.66	.66	.62
D 41	.91	.69	.70	.72	.70
Corresponding $r$ of Mean $z$		.58	.63	.70	.64
<i>Teacher J: 4th—NCS—GC—More</i>					
J 5	.39	.24	.22	.34	.27
J 8	.42	.27	.54	.27	.37
J 13	.51	-.08	.14	.06	.04
J 31	.78	.23	.56	.66	.50
Corresponding $r$ of Mean $z$		.17	.38	.35	.30
<i>Teacher K: 4th—NCS—TC—Less</i>					
K 27-31-1	.62	-.01	.16	.17	.11
K 13	.56	.57	.36	.40	.45
K 35	.76	.36	.24	.39	.33
K 29-42	.69	.48	.66	.62	.59
Corresponding $r$ of Mean $z$		.36	.37	.41	.38
<i>Teacher L: 6th—NCS—GC—Less</i>					
L 3-5	.68	-.02	.07	.12	.06
L 13	.62	.52	.53	.70	.59
L 29	.90	.60	.77	.75	.71
L 33	.59	.62	.50	.42	.52
Corresponding $r$ of Mean $z$		.46	.51	.54	.50
<i>Teacher M-N: 6th—NCS—TC—More</i>					
M 4-8	.38	.42	.10	.34	.29
M 5	.74	.28	.01	.36	.22
M 9	.46	.32	.15	.42	.30
M 31	.53	.17	.00	.23	.13
Corresponding $r$ of Mean $z$		.30	.06	.34	.24

NOTE.—Children numbered 1-24 are boys.  
Children numbered 25-48 are girls.  
4th and 6th refer to grade level.  
CS—Has completed child study.  
NCS—Has never participated in  
child study.

GC—Group-centered climate.  
TC—Teacher-centered climate.  
"More" is teacher more accepting of  
self and others.  
"Less" is teacher less accepting of  
self and others.



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TABLE 2

F RATIOS AND PROBABILITIES OF SIGNIFICANT DIFFERENCES FOR  
INDEPENDENT VARIABLES IN CORRESPONDENCE BETWEEN TEACHERS'  
PERCEPTIONS OF AND CHILDREN'S EXPRESSED SELF-CONCEPTS

<i>Basis of Comparison</i>	<i>F</i>	<i>p</i>
Climzce .....	3.47	
Child Study .....	6.91	.02
Teacher Acceptance .....	12.83	.01
Grade Level .....	11.24	.01
Time .....	.64	
Children .....	1.98	

teachers who are "more" accepting of self and others. Both findings, significant at the 1 per cent level, are contrary to the hypothesized predictions which favored fourth grade teachers and teachers who are "more" accepting of self and others. In testing the effects of climate it was found that group-centered teachers in general do not differ significantly from teacher-centered teachers in the correspondence between their perceptions of and children's expressed self-concepts.

Thus, the findings of this study support only one part of the general hypothesis which relates to teachers' perceptions of children's self-concepts. Only teachers who participated in child study showed significantly greater correspondence between their perceptions and children's perceptions of the latter's self-concepts. For two other comparisons, grade level and teacher acceptance of self and others, results were obtained which were directly opposite to the hypothesized predictions.

In this analysis the "time" factor was not significant, indicating that teachers in general do not change significantly toward greater correspondence between their perceptions of and children's expressed self-concepts. A further analysis of the data in Table 1, however, indicates that the number of higher correlations showing greater correspondence of teachers' perceptions of and children's expressed self-concepts in May as compared with the initial correlations in December is significant at the 5 per cent level. These findings, then, support the second hypothesis with qualification. Teachers change significantly in the number of their perceptions of children's self-concepts which show a greater correspondence to these children's expressed self-concepts, but the magnitude of change toward greater correspondence is not significant. Teachers do not differ significantly for different children or for sex of child in the correspondence between their perceptions of and children's expressed self-perceptions.

Graphic representations of these results showing the mean  $\alpha$  correspondence scores for teacher groups differing with respect to the four variables at the three points of time are shown in Figures 2 and 3. These figures

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reflect generally the findings reported above. It is interesting to note that the correspondence achieved by all teachers between their perceptions of and children's expressed self-concepts was slightly greater in December at the beginning of the study than in February, three months later. This was markedly evident for teacher-centered teachers and to a lesser extent for "more" accepting and sixth grade teachers. Since differences between the three points of time were not significant, these observed differences could be explained as due to chance fluctuations of sample. On the other hand, they may indicate that early in an experience one's initial perceptions are more accurate and valid than are those perceptions which immediately follow. The greater mean  $z$  correspondence scores in May as compared with December and February are strikingly shown in these figures. Only

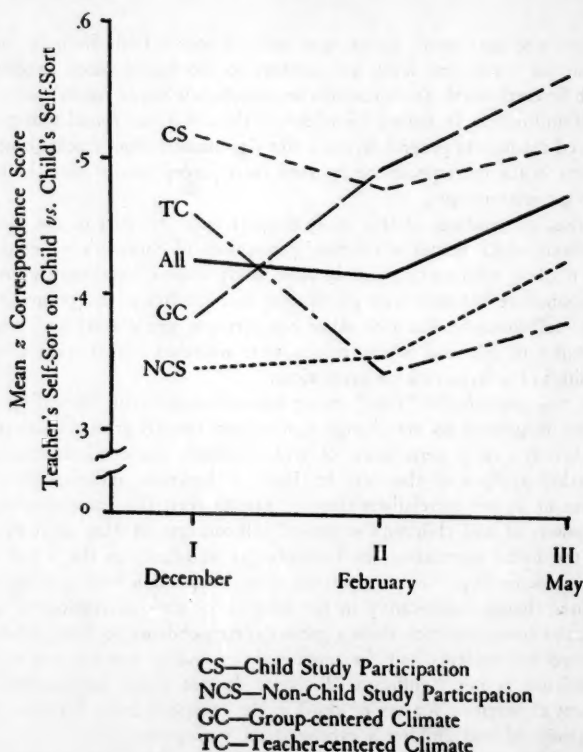


FIGURE 2—Mean  $z$  correspondence scores at three points in time for teachers who differ with respect to child study participation and social-emotional climate.

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teacher-centered teachers failed to achieve a higher mean  $z$  correspondence score in May than they did at the beginning of the study in December.

A general question which is raised by these findings is: What factors might account for the observed discrepancies between teachers' perceptions of and children's expressed self-concepts? In an effort to discover some of the factors involved,  $Q$  correlation coefficients were computed for teachers and children between their first and second and their second and third performances of the  $Q$ -sort. These provided measures of consistency of the teacher's and child's perceptions of the latter's self-concept. Teachers' correlations of consistency varied from  $-.04$  to  $.90$  with a mean consistency coefficient of  $.71$ . The range of children's consistency coefficients was from  $.02$  to  $.86$  with a mean of  $.60$ .

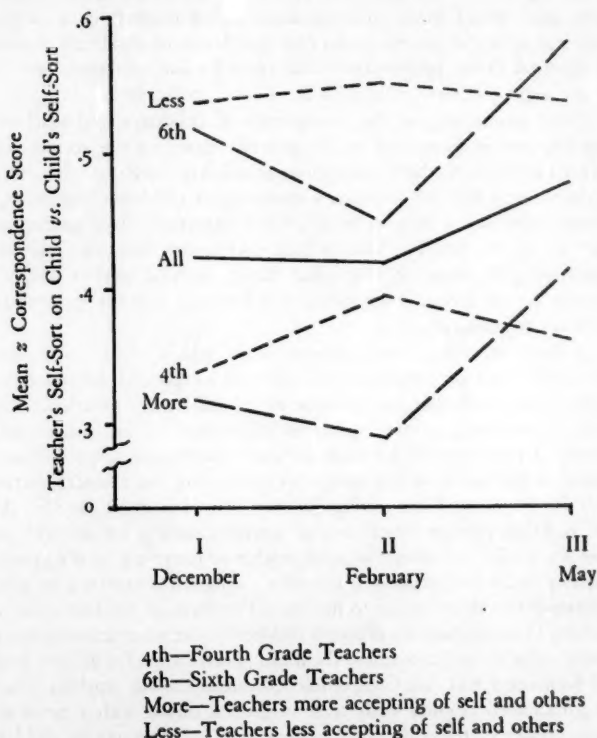


FIGURE 3—Mean  $z$  correspondence scores at three points in time for teachers who differ with respect to grade level and teacher acceptance of self and others.

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An analysis was made to determine the relationships between consistency of teachers and children on repeated performances of the Q-sort and the correspondence between teachers' perceptions of children's self-concepts and these children's expressed self-concepts. An  $r = .50$  was arbitrarily selected as the point which would distinguish "high" and "low" correspondence scores. When frequencies for total "high" and "low" correspondence scores were tested for independence with patterns of teachers' and children's consistency on repeated Q-sort performances, the chi square analysis revealed significant differences at the 5 per cent level.

In a second analysis the mean  $z$  scores and corresponding reliability coefficients of each teacher's consistency for repeated Q-sort performances were ranked, and ranks were assigned to the mean correspondence scores for the eight teachers. Rank-order correlations of ranked mean consistency scores and ranked mean correspondence scores resulted in a correlation coefficient of .50. A similar rank-order correlation of children's consistency for repeated Q-sort performances and ranked mean correspondence scores for the eight teachers produced a correlation coefficient of .60.

These results suggest that consistency of children's and teachers' repeated Q-sort performances are in general related to the correspondence achieved between teachers' perceptions of children's self-concepts and these children's expressed self-concepts. Consistency of children's repeated Q-sort performances would seem to be of greater importance than teacher consistency in this respect. The lack of high correlations between these various factors suggests, however, that other factors such as teacher insight and empathy are of greater importance in influencing teachers' perceptions of children's self-concepts.

In view of the greater correspondence which child study teachers achieved in their perceptions of and children's expressed self-concepts, one might question whether the influence of the child study experience has the effect of producing greater ability to understand an individual child or whether it is the result of a more accurate stereotyping of predictions. An answer to this question was sought by correlating the teacher's sorting of cards for Boy A and her sorting for Boy B; and likewise for Girl A and Girl B. High positive correlations of teacher's sorting for children of the same sex would be evidence of some teacher stereotyping by sex group and also may be an indication of the teacher's own self-consistency in selecting children with values similar to her own. For three of the four child study teachers, Q correlations on different children of the same sex were found in general to be .50 and above, and the mean Q-correlation for all four teachers and both sexes was .46. Comparable Q-correlations for teachers who had not participated in child study were in general mixed with a mean of .31. Thus, greater correspondence in perception of self-concepts by child study teachers may reflect an increased acceptance of children due in part to stereotyping. This result can be viewed as a positive outcome of child study experience.

*Peer Groups' Perceptions of Children's Self-Concepts*

Data on children's perceptions of their fellow classmates' self-concepts were obtained by administering a sociometric questionnaire which asked each child to name up to four classmates whom he believed fit each of 25 qualities of self-reference which were taken from the 50-item Q-sort. The frequency "5" was selected as the "critical frequency" since for most qualities and classrooms being named five or more times by peers was significantly greater than chance at the 5 per cent point. The child's and peer group's perceptions of the child's self-concepts were tabulated as in "agreement" if the child had placed in Q-sort columns 1, 2, or 3 that item in relation to which the peer group had named him at least 5 times. If the child had placed the particular item in column 4, it was rated as "uncertain." If the child had placed the particular item in columns 5, 6, or 7 (Not Me), it was tabulated as a "disagreement." The teacher's and child's placements of like Q-sort items were also tabulated as "agreement," "uncertain," or "disagreement" in the manner described above.

A chi square test of independence comparing the frequencies of agreement, uncertainty, and disagreement for teachers' and peer groups' perceptions of the same children's self-concepts revealed no significant differences. Therefore, the results of this study do not support hypothesis 3, for they show that fourth and sixth grade teachers' perceptions of selected children's self-concepts are not significantly different from those of fourth and sixth grade peer groups in perceiving the respective children's self-concepts. It should be noted, however, that these comparisons were limited to the four children in each classroom for whom the teacher had performed the Q-sort, and they were further limited to those items for which these children had been named by their classroom peers 5 or more times.

A further analysis revealed that the perceptions of peer groups in group-centered classrooms and those whose teachers have completed child study show a significantly greater agreement with children's expressed self-concepts than do the perceptions of peer groups in teacher-centered classrooms and those whose teachers have not participated in child study. Differences in peer group perceptions relating to grade level and teacher acceptance of self and others were not significant. Thus, the general hypothesis concerned with the influence of selected factors on peer groups' perceptions of children's self-concepts is sustained in part, only as it related to climate and teacher participation in child study.

In order to test hypothesis 4 the list of 25 items on the sociometric questionnaire was arbitrarily divided into two groups: (a) a group of 11 "less threatening" percepts, and (b) a group of 14 "more threatening" percepts. Tests of significance revealed that differences of climate and teacher participation in child study were significant at the 1 per cent level for "less threatening" percepts but none of the differences relating to the four selected factors was significant for "more threatening" percepts. Thus, hypothesis 4 is in general supported. These findings suggest that differences

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between the two kinds of percepts may be explained by the hypothesis that "more threatening" percepts attributed to a child by the peer group cannot be accepted by the child because they are inconsistent with the way the child wishes to see himself.

### DISCUSSION

The positive and significant changes in teachers generally and in child study teachers in particular toward greater correspondence between their perceptions of children's self-concepts and these children's expressed self-concepts sustain the hypotheses with respect to these factors. The lack of significant change in magnitude of greater correspondence between teachers' perceptions of children's self-concepts and these children's expressed self-concepts may be explained by the stable and consistent quality of the teacher's self-concept. Because of this quality her ways of seeing things, including her perceptions of children, probably do not change radically during a period of time comparable to that of this study.

A finding which was clearly not anticipated is the significantly greater correspondence in perceptions of children's self-concepts which were achieved by teachers who are "less" accepting of self and others. One explanation which may account for this finding relates to the limitation of the methodology and instrument used in this study. In this respect it should be noted that differences between teachers in acceptance of self and others were far less marked than for the other three variables. Classrooms comprising the sample were actually selected in terms of differences in grade level, teacher participation in child study, and social-emotional climate. The variable of teacher acceptance of self and others was added after the beginning of the study in an effort to identify additional factors which influence teachers' perceptions of children's self-concepts. Since the scores for four teachers were bunched around the mean, it is possible that the Reed Sentence Completion Test did not differentiate clearly two teacher groups as "more" and "less" accepting of self and others.

An equally plausible hypothesis would be one which modifies present theory. It may well be, as these findings show, that persons who are "less" accepting of self and others are actually more insightful in their perceptions of others' self-concepts. Bills (1), for example, found that people who are less accepting of themselves but who believe that other people are more accepting of themselves are highly accurate in their perceptions of reality whereas persons who are self-accepting but who believe others do not accept themselves are quite inaccurate in the perceptions (p. 23). Teachers who are "less" accepting may well develop greater empathy with and insight into feelings of others because of their own heightened sensitivity in the area of interpersonal relationships. On the other hand, teachers who are "more" accepting of self and others may concentrate their energies on dealing with the problem or situation because for them accept-

ance emerges into figure less frequently. In short, they tend to accept children as they are without probing too deeply to discover how these youngsters see and feel about themselves.

The superiority of sixth grade teachers over fourth grade teachers in the correspondence between their perceptions of and children's expressed self-concepts is probably due to the greater stability and consistency of self-concept which is revealed in sixth grade children. This is suggested by the finding that a fairly high positive relationship exists between the consistency of children's repeated Q-sort performances and the correspondence achieved between teachers' perceptions of children's self-concepts and these children's expressed self-concepts. The consistency and stability of children's self-concepts, therefore, would seem to be a more significant factor influencing the correspondence achieved by teachers than is the hypothesized tendency for adults to have less insight and knowledge of children's groups with the increasing maturity of the students.

It should be noted that other factors not identified or evaluated by this study may be more significant in influencing teachers' perceptions of children's self-concepts. Differences in perception, in sensitivity to feelings of others, or in ability or inclination to empathize with others may well be of greater significance in accounting for teacher differences. The ability of a person to make valid hypotheses of another person's self-concepts may be a unique quality of the teacher's self. A teacher may have this skill to a greater or lesser degree because of her unique life experiences and the meanings and integrations she has made of them. These are factors that should be studied by further research.

The lack of significant differences between teachers and peer groups in their perceptions of children's self-concepts may be due to the small number of children (four) and limited number of percepts upon which these comparisons are based. If only those percepts were studied which are easily observed and fairly obvious to teachers and peers alike, there would be small likelihood for significant differences to emerge. This hypothesis should be tested by further research utilizing a larger sample of teachers, peer groups, and number of percepts.

The open and frank responses of fourth graders may result in fairly valid perceptions of their self-concepts by peers and others. This may more than compensate for the more structured peer group and the greater skill, understanding, and maturity which would benefit sixth graders in their perceptions of children's self-concepts.

An alternative explanation would suggest that maturity of groups may not be the most crucial factor which influences peer groups' perceptions of children's self-concepts. This explanation is supported by the findings which indicate the superiority of peer groups in group-centered classrooms and of those who are taught by child study teachers. Indeed, classrooms which have a warm, acceptant climate and those wherein teachers seek to understand children and to facilitate their growth and development



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would seem to be situations which would enable children to perceive their fellow classmates' self-concepts more objectively. Similarly, greater tension in teacher-centered climates and less understanding of children's needs by non-child study teachers would tend to result in peer groups' perceptions of children's self-concepts showing less correspondence with these children's expressed self-concepts. This conclusion and interpretation seems to be warranted by the findings of this study.

Finding that peer groups' perceptions show significantly greater agreement with children's expressed self-concepts for "less threatening" percepts than for "more threatening" percepts is consistent with the hypothesized and commonly observed effects of conflict and threat on learning and behavior. Individuals are reluctant to accept unfavorable percepts into their self-concept, and a frequent way of adjusting to threatening percepts is to relegate them to the "uncertain" and "not me" aspects of self. This would seem to suggest that there is a need for education as well as therapy to provide experiences which would enable persons to become objective, open, and acceptant of all experiences, the unfavorable as well as the favorable percepts.

### SUMMARY

This study investigated the influence of four factors: (a) social-emotional climate, (b) teacher participation in an in-service child study program, (c) teacher acceptance of self and others, and (d) grade level on perceptions of and changes in the self-concepts of children in the fourth and sixth grades. This article reports the findings relating to the influence of the above four factors on teachers' and peer groups' perceptions of children's self-concepts.

The general hypothesis of the study postulated that teachers and peer groups in classrooms which are group-centered, in which the teacher has participated in child study, and those where she was more accepting of self and others would reveal in their perceptions a greater correspondence with children's expressed self-concepts than would teachers and peer groups who differ with respect to these variables. In addition, greater correspondence of perceptions was predicted for fourth grade teachers and sixth grade peer groups.

A representative sample consisting of four fourth grade and four sixth grade classrooms in seven elementary schools of a suburban county school system in Maryland was selected so that extremes with respect to each of the four variables were represented. Classroom climates, group-centered and teacher-centered, were identified using Withall's Climate Index. Teachers who had completed the three-year in-service child study program sponsored by the Institute for Child Study of the University of Maryland were compared with teachers who had never participated in this program. A 50-item Q-sort was developed and used to obtain measures of all children's self-concepts, and it was also used by teachers to register their perceptions



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of selected children's self-concepts. A sociometric questionnaire was developed and used to obtain peer groups' perceptions of children's self-concepts.

The findings of this study are:

1. Teachers' perceptions of children's self-concepts are in general positively and significantly related to these children's expressed self-concepts.
2. Teachers change significantly through time in the increased number of their perceptions of children's self-concepts which show a greater correspondence to those children's expressed self-concepts, but the magnitude of change is not significant.
3. Sixth grade teachers, teachers who have completed three years of child study, and teachers who are less accepting of self and others show in their perceptions of children's self-concepts a significantly greater similarity to these children's expressed self-concepts than do, respectively, fourth grade teachers, teachers who have never participated in child study, and teachers who are more accepting of self and others.
4. Neither fourth grade teachers nor sixth grade teachers show in their perceptions of children's self-concepts any significantly greater similarity with these children's expressed self-concepts than do fourth and sixth grade peer groups in their perceptions of the same children's self-concepts.
5. Peer groups in group-centered climates and those taught by teachers who have completed child study show in their perceptions of children's self-concepts a greater similarity with these children's expressed self-concepts than do peer groups, respectively in teacher-centered climates and those taught by non-child study teachers.
6. Peer group perceptions of children's self-concepts are significantly more like these children's expressed self-concepts for "less threatening" perceptions than they are for "more threatening" perceptions.

From these findings it is concluded that teacher participation in child study is the one of four factors studied which exerts the greatest influence on teachers' and peer groups' achieving increased correspondence between their perceptions of and children's expressed self-concepts. The superiority of child study teachers is a measure of the effectiveness of this in-service program which seeks to help teachers gain a deeper understanding of children's behavior. The results of this study suggests a revision of theory which may be expressed in terms of the following postulate: Teachers who are "less" accepting of self and others are more accurate and insightful in their perceptions of others' self-concepts than are teachers who are "more" accepting of self and others. The implications of this and other findings for further research are discussed.

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## FACTORS INFLUENCING CHANGE IN CHILDREN'S SELF-CONCEPTS

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In a previous article (5) this writer suggested that the self-concept phenomenon can serve education in two ways: (a) as a psychological construct which enables teachers, counselors, parents and others to achieve with training deeper understandings and insights into the behavior and development of children, and (b) as a vital and important aspect of learning and development which the school through its educational processes seeks to promote and foster in every child. The need for a further examination and understanding of the uses of this construct in education provided the focus for an investigation made by this writer of selected factors influencing perceptions of and changes in children's self-concepts. A previous article reported the methodology and the findings of this research which related to teachers' and peer groups' perceptions of children's self-concepts (5). This article will report the findings relating to the influence of selected factors on changes in children's self-concepts.

This second part of the study investigated the effects of four factors, (a) social-emotional climate, (b) teacher participation in an in-service child study program, (c) teacher acceptance of self and others, and (d) grade level, on changes in children's self-concepts in the fourth and sixth grades.

Self-concept was defined as those perceptions, beliefs, feelings, attitudes, and values which the individual views as describing himself. The ideal self was defined in terms of those qualities which describe the person he would like to be. In this study data on children's self-concepts and ideal selves were obtained by means of a Q-sort, an instrument and technique which requires the subject to make a forced normal distribution of a series of self-referent statements. The Q-sort developed for use in this study was a stratified random sample of 50 self-referent statements which had been selected from a universe derived from responses of fourth and sixth grade children reported in a study by Jersild (3). Correlating the child's self-sort with his ideal sort provides a measure of his self-ideal self congruency and may be expressed in terms of a Q-correlation coefficient. Change in self-concept in this study was defined as change in self-ideal congruency.

A representative sample of eight classrooms enrolling 251 children in seven suburban elementary schools of a large county school system in Maryland was selected for study. Classrooms were selected on the basis of their being willing to participate in the research and their being representative of one of the extremes with respect to each of the independent variables: (a) social-emotional climate, group-centered *vs.* teacher-centered,

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(b) participation in child study, completion of the three year program in child study *vs.* no participation in program, (c) teacher acceptance of self and others, more acceptance *vs.* less acceptance of self and others, and (d) grade level, fourth *vs.* sixth.

Classroom climates, group-centered and teacher centered, were identified using Withall's Climate Index (7). Participation in child study referred to teacher participation for three years in the in-service child study program sponsored by the Institute for Child Study of the University of Maryland. Teacher scores on Reed's Sentence Completion Test (6) were used as measures of teacher acceptance of self and others. Scores on the California Test of Mental Maturity, 1953 S Form, and the California Achievement Tests in Language, Reading, and Arithmetic, Primary and Intermediate Forms A and B, were used in ascertaining the relationships between reliability in using the Q-sort and reading and mental age and in correlating changes in school achievement with changes in self-ideal self congruency.

The general hypothesis tested by the second part of this study was as follows: Children in group-centered climates, those whose teachers have participated in child study, those whose teachers have a greater acceptance of self and others, and those in sixth grade will show greater congruency between their self-concepts and ideal selves than will children, respectively, in teacher-centered climates, those whose teachers have never participated in child study, those whose teachers have less acceptance of self and others, and those in fourth grade.

In addition, the following specific hypotheses were tested:

1. Children generally will register positive and significant changes through time toward increased congruency between their self-concepts and ideal selves.
2. Girls will register a significantly greater congruency between their self-concepts and ideal selves than will boys.
3. Children who register greater change in school achievement and peer group acceptance will also show greater change toward congruency between their self-concepts and ideal selves.

## FINDINGS

### *Reliability of Q-sort Instrument*

The results of the reliability test of children in performing the Q-sort, though not a major problem of this investigation, are reported because of the clues they suggest regarding the stability and consistency of children's self-concepts. This test of reliability of children's use of the Q-sort was accomplished by asking the children in each classroom to make a repeated self-sort (self-concept) two to seven days after they had made an initial self-sort. This test of reliability was made during the second collection of data after the children had become familiar with the instruments. Mean  $\bar{x}$  scores and corresponding reliability coefficients for repeated administration of the Q-sorts are reported in Table 1 by sex, classroom, and grade.

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The reliability coefficient of .65 for the Q-sort, though somewhat lower than had been anticipated, indicates, nevertheless, that the Q-sort is a reliable instrument for measuring the self-concepts of children in groups. Since the reliability test of an instrument is also a test of the reliability of persons using the instrument, the observed reliability coefficients of fourth and sixth grade children's use of the Q-sort in this study is indica-

TABLE I

MEAN  $\alpha$  SCORES AND CORRESPONDING RELIABILITY COEFFICIENTS  
OBTAINED FROM REPEATED ADMINISTRATIONS OF Q-SORT

Teacher and Class	B O Y S			G I R L S			ENTIRE CLASS	
	N	Mean $\alpha$	r	N	Mean $\alpha$	r	N	Mean Correspond- ing r
<i>Fourth Grade:</i>								
A .....	18	.616	.55	20	.736	.63	38	.679
B .....	9	.801	.66	6	.766	.64	15	.787
J .....	18	.418	.40	18	.785	.66	36	.601
K .....	16	.651	.51	18	.760	.64	34	.666
Entire Fourth	61	.599	.54	62	.762	.64	123	.683
<i>Sixth Grade:</i>								
C .....	13	.802	.66	18	.924	.73	31	.876
D .....	20	.816	.67	18	1.028	.77	38	.916
L .....	13	.970	.75	10	.935	.73	23	.955
M .....	13	.674	.59	23	.810	.67	36	.761
Entire Sixth	59	.816	.67	69	.924	.73	128	.877
Entire Sample	120	.707	.61	131	.843	.69	251	.780

tive of the level of consistency of their self-concepts at these maturity levels. Thus, the relative consistency of children's self-concepts related not only to the reliability of the Q-sort instrument, but it was also an important aspect of the phenomenon studied by the research.

Other results of the test for reliability reported in Table I indicate that girls' reliability in using the Q-sort instrument was .69 whereas the boys' was .61. Moreover, sixth grade children, whose coefficient was .70, appeared to be more reliable than fourth graders whose coefficient was .59. These differences in reliability between boys and girls and between fourth and sixth grade children were analyzed for significant differences using the normal curve sampling distribution. For a two-tailed test of significance, neither the  $\alpha$  value of 1.06 for sex differences nor the  $\alpha$  value of 1.51 for grade level differences was significant. Since the  $\alpha$  value of 1.51 approaches significance at the 5 per cent point for a one-tailed test, the hypothesis that more mature children revealed greater consistency in their self-concepts than do less mature children should be tested by further research.

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In this research it was assumed that children in fourth and sixth grades have sufficient insight into their selves and sufficient skills in reading and understanding to enable them to use the Q-sort instrument. This assumption suggests that children's reliability in using the Q-sort may be related to reading level and mental age. To ascertain whether such relationships exist, product-moment correlation coefficients were obtained by correlating  $z$  scores of reliability coefficients with grade level scores in reading and with mental age. These are reported in Table 2.

TABLE 2  
PRODUCT-MOMENT CORRELATION COEFFICIENTS BY CLASSROOMS  
OBTAINED BY CORRELATING Q-SORT RELIABILITY  $z$  SCORES  
WITH READING LEVELS AND MENTAL AGES

Teacher & Classroom	Grade	Q-SORT RELIABILITY $z$ SCORE <i>vs.</i>	
		Reading Level	Mental Age
A .....	4 .....	.57	.52
B .....	4 .....	.12	.43
J .....	4 .....	.64	.36
K .....	4 .....	.14	.08
C .....	6 .....	.26	.27
D .....	6 .....	.51	.51
L .....	6 .....	.20	.08
M .....	6 .....	.46	.43
Corresponding $r$ of Mean $z$ .....		.38	.34

The results reported in Table 2 indicate generally that relationships between Q-sort reliability and reading level and mental age are positive but low. These findings are corroborated by those of Brandt (1) who found a low positive relationship between accuracy of self-estimate and intelligence. In the present study it will be noted that correlations of Q-sort reliability with reading level and mental age are quite similar for most classrooms. This suggests that reading performance correlates highly with mental age since Q-sort reliability operated as a constant in these comparisons. From these results it is concluded that other factors such as personal adjustment are probably more closely related to consistency of self-concept than are reading level and mental age.

## Changes in Children's Self-Concepts

Change in self-concept has been defined as change in congruency of the child's self-concept and his ideal self occurring during a specified period of time. An individual may be presumed to be moving toward better adjustment and to be facilitating his self-development when his self-concept and ideal self becomes more congruent. Evidences of children's self-concepts

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and ideal selves were obtained by means of the Q-sort which was administered three times during the study, in December, February, and May, 1954-1955. Q-correlation coefficients of congruency of self-concept and ideal self were recorded for each child and transformed into  $z$  scores. Mean  $z$  scores and corresponding  $r$  correlation coefficients were computed for each

TABLE 3

MEAN  $z$  SCORES AND  $r$  CORRELATION COEFFICIENTS OF CONGRUENCY OF CHILDREN'S SELF-CONCEPTS AND IDEAL SELVES

Teacher and Class	N	Sex	I DEC.		II FEB.		III MAY		Mean $z$ and Corresponding $r$	
			$z$	$r$	$z$	$r$	$z$	$r$	$z$	$r$
A ....	19	Boys	.382	.36	.537	.49	.618	.55	.512	.47
A ....	19	Girls	.418	.40	.675	.59	.633	.56	.575	.52
Mean $z$ & $r$ ...			.400	.38	.606	.54	.625	.55	.544	.50
B ....	10	Boys	.451	.42	.485	.45	.503	.46	.480	.45
B ....	5	Girls	.691	.60	.835	.68	.829	.68	.785	.67
Mean $z$ & $r$ ...			.571	.51	.660	.58	.666	.58	.632	.56
C ....	13	Boys	.604	.54	.565	.51	.662	.58	.610	.54
C ....	14	Girls	.578	.52	.606	.54	.688	.60	.624	.55
Mean $z$ & $r$ ...			.591	.53	.585	.53	.675	.59	.617	.55
D ....	23	Boys	.526	.48	.625	.55	.688	.60	.613	.55
D ....	18	Girls	.641	.56	.815	.67	.827	.68	.761	.64
Mean $z$ & $r$ ...			.584	.53	.720	.62	.758	.64	.687	.60
J ....	15	Boys	.420	.40	.405	.38	.382	.36	.402	.38
J ....	16	Girls	.545	.50	.618	.55	.679	.59	.614	.55
Mean $z$ & $r$ ...			.482	.45	.512	.47	.530	.48	.508	.47
K ....	13	Boys	.360	.35	.355	.34	.303	.29	.339	.33
K ....	18	Girls	.554	.50	.493	.46	.498	.46	.515	.47
Mean $z$ & $r$ ...			.457	.43	.424	.40	.400	.38	.427	.40
L ....	13	Boys	.639	.56	.705	.61	.770	.65	.705	.61
L ....	10	Girls	.432	.41	.657	.58	.688	.60	.592	.53
Mean $z$ & $r$ ...			.536	.49	.681	.59	.729	.62	.648	.57
M-N ..	12	Boys	.428	.40	.399	.38	.582	.52	.470	.44
M-N ..	21	Girls	.475	.44	.481	.45	.666	.58	.541	.49
Mean $z$ & $r$ ...			.452	.42	.440	.41	.624	.55	.505	.47

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sex group, each classroom, and for each of the three times data were collected, and are reported in Table 3.

Analysis of variance tests of significance were made using the data in Table 3 to determine whether differences in congruency of children's self-concepts and ideal selves were significant for each of the four independent variables and for sex group and time. The results of these tests of significance are given in Table 4.

The results of the analysis of variance reported in Table 4 show that differences in congruency of children's self-concepts and ideal selves due to differences in sex are significant at the 1 per cent level. Differences in congruency at different points in time are significant at the 5 per cent level. These findings sustain hypotheses 1 and 2, for they show that girls generally register significantly greater self-ideal self congruency than do boys, but all children reveal significant changes toward greater congruency through time, December to May.

TABLE 4  
F RATIOS AND PROBABILITIES OF SIGNIFICANT DIFFERENCES FOR SEX,  
TIME, AND FOUR INDEPENDENT VARIABLES ON CONGRUENCY OF  
CHILDREN'S SELF-CONCEPTS AND IDEAL SELVES

<i>Basis of Comparison</i>	<i>F</i>	<i>p</i>
Sex .....	9.63	.01
Time .....	3.71	.05
Climate .....	2.12	
Child Study .....	8.65	.01
Teacher Acceptance .....	2.71	
Grade Level .....	7.52	.01

In Table 4 the report of the tests of significant differences relating to the four independent variables shows that differences in children's self-ideal self congruency are significant at the 1 per cent level for the variables of teacher participation in child study and grade level. Differences due to climate and teacher acceptance of self and others are not significant. Sixth grade children and those taught by teachers who have completed child study, then, reveal significantly greater self-ideal self congruency than do fourth grade children and those taught by non-child study teachers, respectively.

A further analysis was made to determine the influence of the independent variables on the proportionate number of increases and decreases in children's self-ideal self congruency. This was accomplished by tabulating for each child in each classroom the frequencies of increase and decrease in self-ideal self congruency as shown by a comparison of  $\pi$  scores for three periods of time, December-February, February-May, and December-May. Chi square tests of independence revealed that the pro-



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portionate numbers of increases and decreases in children's self-ideal self congruencies produced results similar to those obtained by the analysis of variance treatments in Table 4. The chi square results were less clear cut, however, because the effects of magnitude of change were not included. These findings, then, support the general hypothesis only with respect to sixth grades and classrooms whose teachers have completed child study in which children reveal significantly greater change in self-ideal self congruency.

This research also sought to ascertain the relationships that exist between changes in children's self-ideal self congruencies and changes in children's school achievement as shown by differences in scores made on the California Achievement Tests which were administered to the four sixth grade classrooms before and after the period of this study. Evidences of changes in children's self-ideal self congruency were obtained by computing for each child the  $z$  score difference between his  $z$  score self-ideal self congruency in December and his  $z$  score self-ideal self congruency in May. Mean product-moment correlation coefficients for the four sixth grade classrooms for relationships between changes in children's self-ideal self congruency and changes in academic achievement were .09 for language, —.06 for reading, .16 for arithmetic, and .08 for total achievement. Since these coefficients do not differ significantly from zero, it is concluded that there are no significant relationships between changes in children's self-ideal self congruencies and changes in their school achievement.

Finally, this research sought to determine the relationship that exists between changes in children's self-ideal self congruency and changes in their acceptance by the peer group. Measures of change in self-ideal self congruency used in studying this relationship were the same differences in  $z$  score congruency, December and May, which were used previously in correlating this factor with school achievement. Measures of change in peer group acceptance were obtained from the answers children made to a twenty-sixth question on the sociometric questionnaire: Who are your very best friends in this class? Change in peer acceptance was defined as the difference between the number of times a child was named as a friend in December and the number of times he was named in May. Mean product-moment correlations for the relationships of changes in children's self-ideal self congruency and changes in their peer acceptance were .04 for fourth grades and .03 for sixth grades. Mean correlations for the relationship of  $z$  score self-ideal self congruency and peer group acceptance at the end of the study in May, 1955, were .17 for fourth grades and .27 for sixth grades. These findings show that there is a lack of relationship between changes in children's self-ideal self congruency and changes in their acceptance by peers and that children with greater self-ideal self congruency are not chosen more frequently by their peers. Thus, the lack of relationships between change in children's self-ideal self congruency and changes in their school achievement and peer group acceptance indicates a lack of support in this study for hypothesis 3.

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### DISCUSSION

In this research it was posited that increase in self-ideal self congruency facilitates self-development and is evidence of the improved self-adjustment of the individual. Since a major purpose of education is to promote individual self-development, the challenge of helping individuals increase their self-ideal self congruency would seem to be of crucial importance to education.

It is reassuring to note, therefore, that according to the findings of this study children in general do achieve increased self-ideal self congruency during a period of time that they are in attendance at school. Two explanations for this increase are suggested. First, it may be influenced by the general pattern of children's growth and development. It seems reasonable to postulate that as children mature, their self-concepts become more stable and consistent and their self-concepts and ideal selves increase in congruency. This would not deny, of course, the importance of specific factors in the environment or life experience of the individual which would be likely to influence his self-ideal self congruency irrespective of the maturational factor which has been postulated. A second explanation is that the schools may well be a principal factor influencing this general increase in self-ideal self congruency since school experience is the only common factor in the lives of these children. The extent to which the increase can be attributed to school experience may be an indication of the school's effectiveness in facilitating this important aspect of children's development.

It is apparent, however, that the school is not uniformly successful in facilitating greater self-ideal self congruency in all children. The findings of this study show that boys in general achieve significantly less congruency of self-concept and ideal self than do girls. One might hypothesize that the culture generally is responsible for producing these differential changes in boys and girls, but this seems unlikely. The greater physical maturity of the average girl compared with the average boy may be a partial explanation for the observed differences which favor girls. Girls generally are ahead of boys in physical maturity until the end of pubescence when boys finally catch up to the girls. It may well be, then, that the greater self-ideal self congruency registered by girls is an interrelated aspect and concomitant of their increased physical maturity. Brandt (1) found a similar sex difference in his study. He found that boys register greater accuracy of self-estimate in achievement areas than do girls, but the tendency to overrate rather than to underrate themselves was significantly greater among boys.

It seems plausible to hypothesize, too, that in elementary school classrooms boys in general have fewer opportunities for experiences which would enable them to achieve a measure of self-ideal self congruency comparable to that achieved by girls especially when feminine cultural standards predominate in a classroom taught by a woman teacher. The sex of the teacher was controlled in this study by selecting only classrooms

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taught by women teachers. If the patterns of behavior and activities in the school are largely governed by feminine mores and codes, it seems likely that boys would inevitably be less able to behave in ways which permit their achieving self-ideal self congruencies comparable to those of girls. This is an intriguing hypothesis which should be tested by further research.

The findings which show that sixth graders and children of child study teachers achieve greater self-ideal self congruency than do fourth graders and children of non-child study teachers, respectively, are especially noteworthy. The greater congruency of sixth graders in contrast to fourth graders may well be due to their greater maturity and experience. This finding parallels an earlier one which shows that the self-concepts of sixth graders tend to be more stable and consistent than are those of fourth graders. This difference relating to maturity was corroborated by Brandt (1) who found in his study that eleventh grade students were significantly more accurate in self ratings than were sixth grade students.

The greater self-ideal self congruency of children taught by child study teachers would seem to be a consequence of these teachers' having a greater sensitivity to and providing for children's developmental needs as the result of the knowledge and understanding which they had gained in their child study experience. If teachers' experiences in a program employing the direct study of children have been meaningful, it is plausible to expect that the results of child study will be reflected in the freedom and opportunities which result in children achieving greater congruency of self-concepts and ideal selves.

The lack of relationship between changes in children's self-ideal self congruencies and changes in their school achievement and acceptance by peers would seem to indicate that such changes are relatively independent of these other aspects of self-development. Since academic aspects of school life seem to have little relationship with changes in self-ideal self congruency, children who may not achieve well in academic skills can and do achieve in other areas of self-development. Finally, it is recognized that many factors besides the four studied by this research influence changes in children's self-ideal self congruency. These should be identified and studied by further research.

### SUMMARY

A study was made of the influence of four factors, (a) social-emotional climate, (b) teacher participation in an in-service child study program, (c) teacher acceptance of self and others, and (d) grade level, on perceptions of changes in children's self-concepts. This article reports the findings relating to the influence of these factors on changes in children's self-concepts.

A representative sample consisting of four fourth grade and four sixth grade classrooms enrolling 251 children in seven elementary schools of a suburban county school system in Maryland was selected so that extremes

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with respect to the four variables were represented. Evidences of children's self-concepts and ideal selves were obtained by having all children perform a self-sort and ideal sort three different times during a six-months period. Correlating the child's self-sort with his ideal sort provided a measure of self - ideal self congruency. Change in self-concept was in terms of change in self - ideal self congruency.

The findings of the study relative to changes in children's self-concepts are:

1. The self-concepts and ideal selves of children become increasingly and significantly congruent through time.
2. The self - ideal self congruencies of girls generally are significantly greater than those of boys.
3. Sixth grade children and children whose teachers have completed child study show significantly greater self - ideal self congruency than do children, respectively, in fourth grade and those whose teachers have never participated in this child study program.
4. There is little or no relationship between changes in children's self - ideal self congruency and (a) changes in their school achievement, and (b) changes in their acceptance by peers.

In the discussion of the findings it was hypothesized that changes in self - ideal self congruency of children in general may be a manifestation of growth and development and may reflect the positive influence of school experience. The greater self - ideal self congruencies of girls contrasted with boys may relate to their greater physical maturity and may be influenced by the school's feminine mores and codes which tend to favor girls. The greater self - ideal self congruencies of children whose teachers have participated in child study is evidence that this program benefits not only teachers but children as well.

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## THE ROLE OF INCENTIVE IN DISCRIMINATION LEARNING IN CHILDREN<sup>1,2,3</sup>

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Many of the experiments involving the effects of different incentives on children's learning have employed relatively complex tasks (1, 3). In order to provide for more rigorous experimental control, more incentive studies involving children's learning of simple concepts need to be done. Then, as we improve our experimental methods, we can more satisfactorily study the effects of incentives on the learning of more complex tasks. Accordingly, the experiment reported here is the second in a series designed to study the effects of various incentives on simple discrimination learning and transposition in children. In a previous study (5), the differential effects of five incentives on the acquisition and transposition of a button pushing response to the larger of two three-dimensional geometric objects were studied. The five incentives employed were praise, immediate candy, reproof, delayed candy, and light flash. In this earlier problem, the Ss, pre- and elementary school children, assigned to the immediate candy incentive condition learned the concept "larger than" significantly more quickly than did the Ss of all other groups, and transposed more consistently than did any of the other groups except the delayed incentive Ss. The nonsignificant difference in performance of the immediate and delayed groups on the transposition test was somewhat surprising. Even more surprising, perhaps, was the fact that, under the delayed incentive condition, the younger Ss, four- and five-year-olds, learned just as quickly and transposed just as consistently as the older Ss, eight- and nine-year-olds. This is contrary to reports of casual observation made by teachers and other supervisors of children's learning. It was believed that the nature of the delayed reward facilitated learning and transfer. The Ss transferred a dried bean from one jar to another after each correct response, and were told that as soon as they had transferred enough of the beans they could trade

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<sup>3</sup> This investigation was conducted under the auspices of the Behavior Research Laboratory, Psychology Department, University of Colorado.

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them in for a small sack of candy. Thus they were able to see objective evidence of progress toward the delayed goal. It was further thought that a delayed incentive consisting of a mere promise of a sack of candy for learning the task would be much less effective than one where the *S* engages in some activity which provides evidence of progress toward the goal. The present experiment was designed to test the latter belief. Specifically, the purpose of the present experiment was to compare two types of delayed incentives with each other and with an immediate incentive in the acquisition and transposition of a button-pushing response to the larger of two three-dimensional geometric objects.

### METHOD

#### *Subjects*

There were 20 *Ss* in each of the following age categories: four-, five-, eight- and nine-year-olds, with an equal number of boys and girls in each age group.

#### *Materials*

The apparatus for the problem has been described in detail elsewhere (5). There were three pairs of three-dimensional geometric figures in the shape of cubes, cones, and cylinders. The small member of each stimulus set had a basal area of four square inches, while the large member had a basal area of eight square inches. These stimuli are hereafter referred to as the training stimulus sets. A third cube with a basal area of sixteen square inches was used in a transposition test, along with the eight square inch cube. These stimuli are hereafter referred to as the test stimuli. The order of presenting the stimuli and the position of the positive, large-size stimulus were randomized alike for each *S*.

Additional apparatus consisted of a 16 by 24 by 4 inch box which contained the batteries and circuits necessary to operate a signal light. Two jacks and two push-button mounts were on top of the box. The stimuli were placed into the jacks on each trial. Locked onto the rear edge of the box was a 10 by 16 by  $\frac{1}{4}$  inch panel board which contained the signal light. The circuits were arranged so that a correct response, pushing the button at the base of the large stimulus, caused the light to go on.

#### *Design*

There were four experimental groups, all of which were rewarded with a light flash after each correct response. The differential incentive conditions for each group were as follows: The *Ss* of group I, the immediate incentive group, were given a small piece of candy after each correct response. This group is hereafter referred to as the immediate group. The *Ss* of group II, the first delayed incentive group, were instructed to transfer a dried bean from one jar to another after each correct response. These *Ss* also were told that they could trade their beans in for a sack of candy

when they had earned enough of them. This group is hereafter referred to as the token group. Group III Ss, the second delayed incentive group, were simply promised a small sack of candy after they had made the light go on enough times. This group is hereafter referred to as the promise group. Group IV, the control group, received only a light flash indicating a correct response.

The design consisted of two levels of chronological age in addition to the four treatment groups. The four- and five-year-olds constituted one level; while the eight- and nine-year-olds were the other level. Within each level the Ss were randomly assigned to the four treatments, making a total of 10 Ss in each treatment-level combination.

### *Procedure*

The Ss were tested individually. Each S received the following instructions: "This is a game where I want you to try to choose one of these (E points to the training stimulus sets), and push the button in front of the one you choose. If you are right, this little light will go on. If you are wrong, the light will not go on. Now remember, the game is to see how quickly you can learn to choose the one that makes the light go on." The last sentence was repeated after every tenth trial. Immediately after reaching a criterion of nine of 10 correct responses, each S was given a four-trial transposition test on the test stimuli. The same differential incentive conditions employed during the acquisition trials were continued during the test trials.

### RESULTS

An analysis of variance was performed on each of the two criterion measures: number of trials to the criterion, and number of correct responses on the transposition test. Table 1 contains both the training and transposition data. All tests performed on the transposition data were non-significant. For the acquisition data, the tests of interaction and main effects of chronological age were nonsignificant, while the treatment differences were significant beyond the 1 per cent level. The summary of the analysis of variance of the acquisition data is in Table 2. The promise group required significantly more trials to learn the concept than did all of the other groups. All other differences were of a chance nature.

Since the Bartlett test of homogeneity of variance was significant, and since some of the within cells distributions were somewhat skewed, it seemed advisable to submit the data to a statistical test requiring no assumptions of normality nor homogeneity. For this purpose the Friedman two-way analysis of variance by ranks technique (4) was employed and the resulting  $\chi^2$  was significant well beyond the 1 per cent level. The Ss who were given a promise of a delayed incentive required more trials to learn the task at all age levels with the exception of the nine-year-level, where they were second only to the immediately rewarded group.



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TABLE 1

MEANS AND STANDARD DEVIATIONS OF TRIALS TO CRITERION IN  
TRAINING AND CORRECT RESPONSES IN TRANSPOSITION TEST(Each treatment group  $N = 20$ )

Group	TRAINING		TRANSPOSITION	
	Mean	SD	Mean	SD
<i>Reward:</i>				
Immediate .....	9.15	13.58	4.00	0.00
Token .....	6.15	6.59	3.80	0.87
Promise .....	20.08	21.05	3.75	0.62
Control .....	7.35	6.99	3.75	0.70
<i>Age level:</i>				
4 and 5 .....	10.62	16.75	3.85	0.66
8 and 9 .....	10.72	11.88	3.80	0.64

TABLE 2

ANALYSIS OF VARIANCE OF NUMBER OF TRIALS TO CRITERION

Source	df	Mean Square	F
Rewards .....	3	811.65	4.25**
Age levels .....	1	0.20	
Interaction .....	3	232.40	1.21
Within cells .....	72	190.62	

\*\*  $p < .01$ .

## DISCUSSION

The relationship between the immediate, token, and promise groups of this experiment was about as predicted from the results of the previously mentioned experiment (5). That is, it was expected that the Ss of the token group would learn more quickly than those of the promise group. Also, the fact that the token group learned as quickly as the immediate group is no surprise, in view of the fact that in the previous study there was no difference between these two groups on the transposition test. Both of these experiments, then, suggest that this type of delayed incentive, namely the token type, applied to this kind of learning task is just as effective as an immediate incentive.

The difference in behavior of the control group Ss of the previous and present experiments requires some consideration. In the former, the control group Ss required significantly more trials to learn the concept than did any of the other groups, while in the present study the control Ss learned as quickly as the token and immediate Ss. In the earlier study, the mean



number of trials to the criterion for the immediate, token, and control groups respectively were 14.66, 26.53, and 35.47. In the two experiments these groups were treated identically, and the same age levels were used. However, different experimenters and populations were employed. It is felt that differences in population characteristics account for the difference between the control groups of these two studies. In the former experiment, the Ss were from Tallahassee, Florida, while in the present study they were from Boulder, Colorado. The principal difference in the samples selected from these two populations was in socioeconomic level. The ratio of rural to urban children in the Florida sample was much greater than in the Colorado sample. The Ss used in the Colorado sample were from a residential area consisting almost entirely of people from business and higher professional occupations.<sup>4</sup> To test the hypothesis that the socioeconomic factor is relevant here, another similar experiment was performed on a predominantly rural sample from the Boulder, Colorado area. The results of this experiment support the hypothesis, since these control group Ss behaved similarly, in relation to the other reward groups, to those of the Florida sample.

There is empirical evidence to suggest that the crucial variable distinguishing the socioeconomic groups of the previous and present experiments is the matter of intrinsic motivation (2). That is, to the Ss of the Colorado sample, good performance, irrespective of incentives offered them, was immensely important. Some support of this hypothesis is found in the fact that when the Ss of the present study were questioned after the experiment about "the best way to get them to do something," a great majority of them answered "ask me" in preference to either "promise me something" or "give me a piece of candy." Also, almost all Ss indicated that they would rather do something for the "fun of it" than be "promised something for doing it." Unfortunately, no information of this kind is available on the Ss of the previous study. This same hypothesis might be offered as a partial explanation for the fact that the immediate incentive group of the earlier experiment learned more quickly than the token group, while there was no difference between these two groups in the present study.

It appears very important to attempt some explanation of the inhibiting effect of a promised incentive, found in the present experiment. Two operational hypotheses will be offered. One is that the child's history with respect to his promises having been fulfilled or unfulfilled is relevant. Research designed to manipulate this variable experimentally by fulfilling promises to a random selection of Ss and nonfulfilling promises to another random selection is now under way. The prediction is that those Ss whose promises have been fulfilled will learn more quickly under a promise incentive than those whose promises have been unfulfilled.

<sup>4</sup> That the Colorado sample was from a higher socioeconomic level than the Florida group may also account for the fact that the former Ss generally learned the task much more quickly.

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Another possible explanation for the relatively slow learning of the promise group lies in the meaninglessness of a promise incentive in the acquisition of a larger-than concept. The plausibility of this hypothesis is strengthened somewhat by the fact that, as has been mentioned above, almost all of the *Ss* of the present study indicated that they would rather do something for the fun of it than to be promised something for it. This hypothesis might be tested by making the promise condition fun or meaningful in relation to the task to be learned. One possible way to do this would be to instruct one group of promise incentive *Ss* to pretend that they are filling their imaginary sack with candy that the *E* pretends to place before them after each correct response. The performance of a group of *Ss* so treated may then be compared with another group, treated as those promise *Ss* were in the present experiment. Such an experiment is currently in progress.

Some mention should be made of the fact that there were no treatment differences in mean number of transposition responses. Since all but seven *Ss* transposed on every trial, and these *Ss* were quite evenly distributed among the treatment groups, it appears that the simplicity of the task for these *Ss* masked any incentive effect on the transposition test.

## SUMMARY

An experiment has been described showing the effectiveness of one type of delayed incentive, token, as compared with another, promise, and an immediate incentive, in the learning and transposition of a simple button-pushing response to the larger of two three-dimensional geometric objects. Operational hypotheses to explain the differences have been briefly described. It is believed that a systematic study of motivational variables underlying children's performance in simple tasks of this nature will greatly facilitate the eventual study of the role of incentives in the acquisition of more complex responses.

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## PERCEPTUAL RIGIDITY AND CLOSURE PHENOMENON AS A FUNCTION OF MANIFEST ANXIETY IN CHILDREN

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An increasing number of investigations have been concerned with the psychological and behavioral correlates of the Taylor manifest anxiety scale (19). The Taylor scale (MAS) is coordinated with the theoretical drive (D) variable in Hull's behavior theory; i.e., scores on the test presumably reflect variations in the emotional reactivity (drive) of the individual. Predictions generated from the Hullian assumptions regarding the functional relationship between drive level and performance have been, in general, confirmed in a variety of simple and complex learning situations (e.g., 5, 7). However, the failure of several studies (1, 9, 12) to yield data consistent with these assumptions indicates the need for continued experimental efforts designed to clarify the functional properties of the manifest anxiety scale. The present investigation was designed to explore certain perceptual consequences of manifest anxiety in children.

In a recent review of experimental studies concerned with the relationship between motivation and learning, Bruner *et al.* (3) indicate that a reduction in behavioral adaptivity is often associated with high levels of "drive." These writers suggest that "... conditions requiring increased speed and efficiency of goal attainment . . . (e.g., deprivation) . . . may have the effect of narrowing the range of environmental cues to which the individual responds" (3, p. 9). Similar "perceptual constriction" effects have been noted to be associated with induced anxiety (18), motivational relevance and context of the task stimuli (8), and level of anxiety (13). However, the theoretical and experimental problems associated with specifying the processes which mediate the "narrowing of the perceptual field" have received relatively little attention.

One plausible explanation for the reduction in responsiveness to environmental cues is that relatively high motivational levels tend to increase

<sup>1</sup> The data for this study were collected while the author was a member of the staff of the Iowa Child Welfare Research Station, State University of Iowa.

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perceptual rigidity and closure tendencies. Empirical support for this assumption may be found in numerous investigations of the effects of anxiety or stress on perceptual-cognitive processes. Most directly relevant here are the studies reported by Moffit and Stagner (10) and Smock (14, 15, 16) on the relationship between anxiety and performance in a variety of perceptual task situations. Data obtained in the latter series of investigations, for example, indicate that experimentally-induced anxiety increases the tendency for individuals to adhere to pre-recognition responses, to respond on the basis of minimal "information," and to be relatively retarded in their recognition of incongruous stimulus configurations. Moffit and Stagner (10), using the Taylor scale as the index of anxiety, report a significant relationship between anxiety level and perceptual rigidity under similar experimental conditions. These data lend strong support to the assumption that anxiety is associated with increased strength of prevailing perceptual expectancies.

If the preceding analysis is correct, the association between high levels of motivation and reduction in responsiveness to environmental cues could be attributed to the effects of motivation on the increased tendency toward perceptual rigidity under "stress" conditions. Therefore, one would expect a relatively high degree of manifest anxiety (i.e., drive) to be related to perceptual rigidity and, secondarily, to increased speed of closure. The purpose of this study was to explore this hypothesis. Specifically, in terms of the experimental tasks, it was predicted that relatively high anxiety subjects will: (a) tend to respond, on a decision-making task, prior to the availability of sufficient information to obtain the correct response (cognitive closure); (b) obtain relatively shorter latencies on a simple recognition task (perceptual closure); and (c) manifest more perceptual rigidity on a task where the initial stimulus of a series is successively modified to form a new stimulus configuration.

## EXPERIMENTAL METHOD

### *Subjects*

The total sample consisted of 127 fifth-grade children from a city school system.<sup>2</sup> The results are based on data from 118 subjects (54 female and 64 male) who completed the necessary tests on both testing occasions.

### *Anxiety Scale*

The index of anxiety level for this study was derived from scores on the children's manifest anxiety scale (4). The reported test-retest reliability of the CMAS ranges from .61 to .75 depending on the age and sex of the Ss;

<sup>2</sup> Appreciation is extended to the officials of the Cedar Rapids, Iowa, school system, and the principals, teachers, and students of the Cleveland and Harrison schools, for their cooperation in this study. Special appreciation is also extended to Mr. Langdon Longstreth who participated in the collection of the data for this study.

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an independent study (unpublished) by the present author yielded slightly higher test-retest reliabilities, over a three-months period, for seventh and eighth grade school children.

### *Perceptual-Cognitive Tasks*

*Decision Location Task.* The index of speed of "cognitive closure" was derived from performance on the complex decision-making tasks (DLT-S) used in previous investigations concerned with the hypothesized relationship between "intolerance of ambiguity" and anxiety (14, 15). Each task consists of 15 cards that are presented in serial order to the Ss. The first card contains only a few elements of a picture which, by adding stimulus elements on successive cards, appears complete on card 15. A four-card sample task was administered for purposes of demonstration. Prior to the administration of each experimental series (tasks) Ss were presented with four "hypotheses" or possible correct responses. The hypotheses were drawn from the generic class of objects representing the correct response; e.g., the correct response on Task B was "cat," the pre-task hypotheses were, in order, dog, lion, cat, rabbit.

*Perceptual Closure Task.* The measure of speed of perceptual closure consisted of 12 pictures from the Street Gestalt Closure test (SGCT). A previous study (16) suggested that speed of closure tended to vary with the familiarity of the stimulus. Therefore, the pictures used here were categorized according to "difficulty level" on the basis of the data obtained in that investigation; four "easy," four "difficult," and four pictures of medium difficulty were included. The latency, to the nearest 1/10 second, of the first and of the correct response were recorded as the index of the speed of perceptual closure.

*Perceptual Rigidity Task.* An index of perceptual rigidity was obtained from a transition task (PRT) described in a previous study (16). The task was constructed by extending the series of 15 cards in each of the DLT-S tasks to a total of 30 stimulus cards. The cards from number 16 through 30 of transitional stages whereby the completed stimulus on card 15 (e.g., a cat) was modified until a new stimulus (e.g., a dog) appeared completed on card 30. Each transition task was administered immediately following its associated DLT-S task. As indicated below, S was instructed to report what he saw on each card *after* the *first response* had occurred in the DLT-S series. The measure of rigidity was the number of cards which elicited the response that was correct for card 15.

### *Procedure*

The initial investigation compared the performance of 20 high and 20 low anxiety Ss on the three experimental tasks. A second experiment was conducted to explore the feasibility of group administration of the DLT-S and PRT tasks. The specific procedures for each experiment are presented below.

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*Experiment I.* Ss scoring in the top and bottom 20 per cent of the distribution of scores on the CMAS were selected for the first experiment. Due to absences during the scheduled days of testing, the number of Ss in both groups was reduced to 20. Each S was first administered one of the DLT-S tasks (Task E; 14) and the associated transition task (Task E-T) from which the measures of "cognitive-closure" and perceptual rigidity were obtained. Prior to the administration of the task, a three-card sample series was shown to each S. Following the pre-task, S was permitted to look at the "hypothesis" card, on which the four possible correct responses for that task were printed, for 10 seconds. The instructions accompanying the DLT-S task emphasized that the purpose of the task was to determine *how few cards* the S needed to see in order "to put all the parts together" and report the correct answer.

Ss were permitted to view each card in the series for five seconds. If no response was made, E turned up the next card. The effect of pre-recognition responses on recognition was controlled as much as possible by requiring Ss to report what they saw on each card *after the first report (identification response)* occurred. E gave no indication to S that the first, or subsequent, responses (including the PRT) had been correct or incorrect. All responses, including those to the cards in the transition series (i.e., cards 16 to 30) were recorded verbatim. The trial of first response was recorded as the measure of the speed of perceptual-cognitive closure. The index of perceptual rigidity was the number of perseverative responses; i.e., responses made to the stimulus cards 16 to 30 that had been correct for card 15.

A modified form of the Street Gestalt test was administered following the DLT-S and PRT tasks. Each picture was presented to the Ss with instructions to identify the picture. If the first response was incorrect, Ss were asked to "try again." If the correct response was not elicited within two minutes, the next picture was presented to the subject. The latency of all responses was recorded to the nearest 1/10 of a second.

*Experiment II.* The total sample was administered a group form of three DLT-S and Transition tasks (Tasks A, B, C; 14) four months after Experiment I was completed. The stimuli were projected on a screen in the front of the room. The procedure and instructions were identical to those used in the individual sessions, with the exception that each stimulus card was exposed for only one second (controlled by leaf-diaphragm tachistoscope). Ss recorded their responses in booklets provided for that purpose. These booklets consisted of 15 pages; each page had a space for writing the response or indicating a "don't know" answer on each trial. If a response other than "dk" was made, Ss were instructed to indicate the certainty of their response on a three-point rating scale; i.e., uncertain, certain, very certain. After the exposure of each card and the recording of their response, Ss folded that page back and under; this, and the presence of teachers as proctors, precluded Ss from going back to change responses. Responses to

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the stimuli 16 through 30 were recorded on the back of the booklets. The sample task was re-administered prior to the second and third tasks since the transition stimuli (PRT) were likely to introduce a different set than had prevailed initially on the first DLT-S task.

RESULTS

*Experiment 1*

Hypotheses 1 and 2 stated that a high level of anxiety, under the present experimental conditions, would be associated with relatively stronger tendencies toward cognitive and perceptual closure as indicated by shorter "latency" on both the decision location task and the object recognition test. Table 1 presents the data relevant to these hypotheses.

TABLE 1

MEAN TRIAL OF FIRST DECISION AND LATENCY OF RESPONSE FOR  
HIGH AND LOW ANXIETY SUBJECTS ON THE EXPERIMENTAL  
MEASURES OF COGNITIVE AND PERCEPTUAL CLOSURE

	DLT-S <i>Trial of First Response</i>	SGCT DIFFICULTY LEVEL (latency in seconds)		
		<i>Easy</i>	<i>Medium</i>	<i>Difficult</i>
<i>High Anxiety:</i>				
Mean .....	3.45	1.64	9.51	24.88
Variance .....	11.85	.15	61.19	228.53
<i>Low Anxiety:</i>				
Mean .....	5.07	1.72	5.40	14.19
Variance .....	10.25	.45	10.71	150.43

The difference between high and low anxiety groups on the mean trial of first decision, on the DLT-S, (3.45 and 5.07 respectively) is statistically significant beyond the 10 per cent level of confidence ( $t = 1.72$ ;  $df = 38$ ;  $.10 > p > .05$ ). Analysis of variance of the latency data obtained from performance on the SGCT task (Table 1) yielded an  $F$  ratio of 5.48 for the main effect of anxiety which, for 1 and 38 degrees of freedom, is significant between the .02 and .01 level of confidence. The main effect of difficulty level and the interaction between anxiety and difficulty were also statistically significant; ( $F = 36.21$  and  $21.32$ ;  $df = 2, 76$ ;  $p < .001$ ). The high anxiety Ss obtained a relatively shorter latency of response only on the tasks classified as "easy"; over-all, this group had significantly longer latency of response. The lack of confirmation of the first hypothesis with respect to the more "difficult" perceptual tasks may be a function of



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an artifact introduced by the procedures, or of the differential effects of drive on response strength in "simple" as compared to "complex" task situations (5, 7). This problem will be discussed more fully in a later section of the paper.

The third prediction was that individuals scoring higher on the CMAS would manifest relatively more perceptual rigidity as indicated by perseverative-response tendencies on the transition task (PRT). However, in order to attribute the response perseveration to *perceptual rigidity*, it is necessary to rule out the effect of reinforcement of verbal responses (i.e., number of correct responses) in the initial series of cards (DLT-S). The comparison of the high and low anxiety groups on the trial of correct response yielded a  $t$  of 1.63 ( $df = 38$ ;  $p > .10$ ). The product-moment correlations between number of correct responses prior to card 15 and perseverative response on cards 16 to 30 for the anxiety groups combined and separately also were statistically nonsignificant (High,  $r = -.22$ ; Low,  $r = -.27$ ; High + Low,  $r = -.19$ ;  $p > .10$ ). It would appear therefore, that any differences between the two groups on perseverative tendencies can be attributed to the effects of anxiety level on perceptual rigidity.

The mean number of perseverative responses was 6.90 for the high anxiety Ss and 5.01 for the low anxiety Ss. This difference is statistically reliable beyond the .05 level of confidence as indicated by a  $t$  of 2.31 ( $df = 38$ ;  $.05 > p > .02$ ). These data confirm the findings of a previous study concerned with the relationship between indices of anxiety level and response perseveration on this task (16).

### Experiment II

The procedure for the second experiment did not permit administration of the Street Test (SGCT). However, two measures of cognitive closure were available; the trial of first response, and the certainty score associated with each pre-recognition response on the 15 card series of the DLT task. Furthermore, the group administration permitted the testing of sufficient number of Ss so that the performance of those scoring in the middle range of the CMAS could be examined. The following analysis was based on the performance of the Ss scoring in the upper, middle, and lower 20 per cent of the distribution of the CMAS score ( $N = 24$  in each group). Table 2 presents the summary of the data obtained from each anxiety group on each of the three experimental DLT-S tasks.

Analysis of variance of these data indicated the differences between the anxiety groups, although in the predicted direction, did not reach a high level of reliability ( $F = 2.03$ ;  $df = 2, 69$ ;  $.15 > p > .10$ ). A statistically significant difference was attributable to the task (trial) variable<sup>8</sup> ( $F = 4.36$ ;  $df = 2, 138$ ;  $.02 > p > .01$ ). Similar trends were obtained

<sup>8</sup> The tasks were administered in the same order (A, B, C) to all groups.



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TABLE 2

MEAN TRIAL OF FIRST RESPONSE ON THREE EXPERIMENTAL DLT-S  
TASKS FOR HIGH, MEDIUM, AND LOW ANXIETY SUBJECTS

	<i>Task A</i>	<i>Task B</i>	<i>Task C</i>
<i>High Anxiety:</i>			
Mean .....	4.50	4.08	3.13
Variance .....	21.75	13.51	11.90
<i>Medium Anxiety:</i>			
Mean .....	6.08	5.88	4.79
Variance .....	15.89	11.53	12.67
<i>Low Anxiety:</i>			
Mean .....	6.21	5.92	4.63
Variance .....	15.32	14.04	12.00

in a previous study (14) and are probably a function of the repeated reinforcement of the "early" response set over a series of trials. Further analysis confirmed the impression gained from the table that most of the reliable differences reported above could be attributed to the difference between the high anxiety Ss as compared to the other two groups.

A second index of cognitive closure was obtained from the average degree of subjective certainty expressed by each S on the pre-recognition responses on each task. The average certainty score for each S was computed by dividing the sum of the weighted certainty scores (3 = Very Certain; 2 = Certain; 1 = Uncertain; 0 = Very Uncertain) by the number of trials between the *first decision* and the trial of *correct response*. Analysis of variance of these scores yielded an *F* ratio of 2.45 ( $df = 2, 69$ ;  $.10 > p > .05$ ) for the between-groups comparison. The main effect of tasks, and the interaction of anxiety level and tasks, did not prove to be statistically reliable.

Table 3 presents the data relevant to the hypothesized relationship between manifest anxiety and perceptual rigidity. Analysis of variance of these data indicated the differences between groups and tasks were both significant beyond the .02 level of confidence ( $F = 5.44$ ,  $df = 2, 69$ ;  $F = 4.15$ ,  $df = 2, 138$ ). The correlation between number of correct responses on the DLT-S and perseveration for the total group of Ss was  $-.21$  which for 70 degrees of freedom is not statistically significant at the 10 per cent level of confidence. These findings are consistent with those obtained in the first experiment and lend support to the assumption that the perseveration effect is a function of perceptual, rather than response, rigidity.

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TABLE 3

MEAN NUMBER OF PERSEVERATIVE RESPONSES ON THE THREE EXPERIMENTAL TASKS FOR HIGH, MEDIUM, AND LOW ANXIETY GROUPS

	Task A	Task B	Task C
<i>High Anxiety:</i>			
Mean .....	7.88	8.46	6.71
Variance .....	14.54	15.57	10.70
<i>Medium Anxiety:</i>			
Mean .....	7.00	5.62	4.12
Variance .....	12.42	10.32	5.94
<i>Low Anxiety:</i>			
Mean .....	6.54	6.00	5.11
Variance .....	8.42	13.83	7.75

## DISCUSSION

These data indicate that high manifest anxiety, as measured by the children's anxiety scale, is associated with relatively more perceptual rigidity and, under certain conditions, increased speed of closure.<sup>4</sup> The findings are generally consistent, therefore, with the experimental evidence on the effects of anxiety on perceptual-cognitive functioning (2, 10, 14, 15). Further, in view of the relationship between manifest anxiety and perceptual constriction or "stimulus fixation" (8, 10, 13, 18), the data indirectly support the assumption that "decreased responsiveness" to environmental cues (1, 2) may be some functional derivative of these perceptual consequences of high levels of motivation or drive.

Contrary to expectations, the high anxiety subjects obtained, over-all, a longer latency of response on the *perceptual closure* tasks than low anxiety subjects. These results, and the statistically significant interaction between anxiety level and task difficulty, might be attributed to one of two factors. First of all, the tasks were, unfortunately, administered in the order of difficulty. The relatively longer latency on the more difficult tasks may have been a function of the differential reaction to "failure" (incorrect responses) of the high-anxiety Ss. It had been noted in previous investigations (14, 16) that successive failure experiences, in general, tend to evoke a relatively stronger accuracy orientation on the part of anxious

<sup>4</sup> There is no evidence from the results of this study to suggest these relationships could be attributed to differential levels of intelligence associated with high and low CMAS scores. The correlations between CTMM scores and CMAS, response perseveration, and latency of closure ranged from  $-.17$  to  $-.14$ ; none was significantly different from zero.

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subjects. Response suppression may, therefore, account for the negative findings with respect to this task.

One might also argue that the obtained relationship between manifest anxiety and performance on these tasks is indicative of the effects of anxiety on strength of the response system rather than on the mediating functions of the perception (6). According to the general laws of associative learning, performance on a "perceptual" task may be considered a joint and multiplicative function of the strength of the perceptual response disposition (associative strength) and drive level (5, 7). The obtained relationship between manifest anxiety and response perseveration on the transition task (PRT) would, therefore, be a consequence of the tendency for the dominant response tendency (correct response) to be evoked by more dissimilar stimuli. Further, the interaction between anxiety level and task difficulty on the Street closure test also would be predicted if one made the additional assumption that "easy" and "correct response dominant" are synonymous.

However, a recent experiment reported by Saltz and Hoehn (12) failed to lend support to the latter assumption. Further, the data reported here indicated that the trial of correct response on the DLT-S task did not differentiate between high and low anxiety subjects, nor was the frequency of correct response significantly related to the degree of perseveration on the transition task. As suggested in the earlier discussion, these data lend support to the contention that perceptual rigidity, associated with high anxiety levels, is a more important determinant of perseveration tendencies than response (associative) strength.

While the results of this study permit only the most cautious generalization, when considered in conjunction with other recent investigations (2, 3, 10, 16), the data appear most consistent with the assumption that motivational variables exert certain direct influences on perceptual processes. Despite the controversy surrounding this assumption, both theoretical and empirical considerations indicate the distinction between the *perceptual* system and other response systems (e.g., 2, 6, 11) is a valid one. Further research, directed toward determining the conditions under which motivational factors influence perception, should permit more specific generalizations concerning the nature of these effects. Further, in view of the recent evidence concerning the role of early perceptual experience on subsequent behavior tendencies, an analysis of the extent to which the perceptual consequences of motivation (e.g., anxiety) varies with maturational and experiential factors would seem particularly important for achieving a more adequate understanding of psychological development.

#### SUMMARY

The purpose of this study was to determine some of the perceptual consequences of manifest anxiety in children. It was proposed that the reduction in behavioral adaptivity associated with high levels of motivation

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might be due to the effects of certain motivational states on perceptual rigidity and closure tendencies. Therefore, individuals with relatively high levels of manifest anxiety (drive) would be expected to achieve a shorter latency on a cognitive and perceptual closure task and to respond to a previously reinforced stimulus (perception) more frequently than individuals with a lower level of anxiety.

The children's form (CMAS) of the Taylor manifest anxiety scale was administered to 118 fifth-grade children. Measures of cognitive-perceptual closure and rigidity were individually administered to the upper and lower 20 per cent of those Ss (Experiment I). Four months later a second series of tasks were administered to the total group of Ss and the results obtained from the upper, middle, and lower 20 per cent of the CMAS were analyzed (Experiment II). The results generally confirmed the predicted relationships between manifest anxiety and perceptual rigidity and closure phenomenon.

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## THE CAUSATION AND MANIFESTATIONS OF EMOTIONAL BEHAVIOR IN FILIPINO CHILDREN<sup>1</sup>

RACHEL MARZAN INSELBERG<sup>2</sup>

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Many studies on the emotional behavior of children have dealt with aggressive behavior. A small number of investigators have attempted to survey the wide spectrum of emotional reactions of children.

The objectives of the present study were to compare two age groups of Filipino children with respect to (a) the situations causing emotional episodes, (b) the manifestations of emotional behavior, and (c) the reactions of adults to these emotional episodes.

Blatz, Chant, and Salter (2) report that as the child grows older emotional behavior undergoes a change, becoming increasingly directed and correspondingly less irrelevant and chaotic in nature.

Several investigators have studied aggressive behavior in children (1, 3, 4, 5, 9). Doob and Sears (4) found that overtness of aggression varied inversely with the amount of punishment anticipated. The findings of Walters, Pearce, and Dahms (9) indicated that aggression tended to increase from two through four years of age. Appel (1) found that a major number of aggressive episodes arose from a desire for the possession of property. This interest in things per se tended to decrease with age.

Dollard *et al.* (3) concluded that the peak of negativism occurring at about three years of age resulting from frustration caused by feeding problems, cleanliness, and training. Frederiksen (5) reported that frustration brought about negativistic behavior of the withdrawal type.

Heathers (7) and Hattwick and Sanders (6) found that as a preschool child grows older, he increasingly seeks attention and approval from adults.

<sup>1</sup> This study was conducted at the Philippine Women's University. The author wishes to acknowledge the inspiration derived from Mrs. Doreen Gamboa, Head, Department of Child Development.

<sup>2</sup> Formerly connected with Philippine Women's University.

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### SUBJECTS

The subjects studied were 62 Filipino children, 31 from two to four years of age and an equal number between five and seven years of age. The majority of the children belonged to the families of the observers. Thirty-six per cent of the subjects belonged to families of the professional group (e.g., lawyers, engineers, physicians, and teachers); 36 per cent, to the laboring group; and 28 per cent, to government employees, secretaries, bookkeepers, and owners of small retail stores.

### PROCEDURE

The method used in this study was direct observation with predetermined categories. The classification scheme used was based partly on the work of Landreth (8). Repeated revision yielded the final instrument employed in the study. A check list was used to facilitate observation.

Emotional episodes were studied from three standpoints: situations causing emotional behavior, manifestations of emotional behavior, and reactions of adults in dealing with these episodes.

This study was mainly concerned with the direct or immediate situations causing specific outbursts. Hence, such contributing factors as ill-health, fatigue, and time of day were not considered.

Observations were carried out by teachers attending summer school. The observations were made at home over a six-week period. The observers were oriented as to the objectives of the study, and were asked to record pertinent information following each emotional episode occurring in the home.

A grand total of 755 emotional episodes were recorded during the observation period, 390 in the two to four year group and 365 in the five to seven year group. It should be noted that the number of manifestations of emotional behavior and of adult reactions exceeded the number of emotional episodes, since more than one manifestation or adult reaction may have been associated with a particular emotional episode.

### RESULTS

The frequencies of emotional episodes caused by various situations are presented in Table 1. The corresponding frequencies of the two age groups are compared by means of a *t* test. The level of significance is given in the table.

Established home and health routine gave rise to a significantly larger frequency of emotional episodes in the older group. On the other hand, play activities resulted in a significantly larger frequency of emotional episodes in the younger group. There was no significant difference in the



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TABLE I  
SITUATIONS CAUSING EMOTIONAL BEHAVIOR—FREQUENCIES OF  
EMOTIONAL EPISODES

	2-4 YEAR GROUP			5-7 YEAR GROUP			Signif. Level
	No.	Freq. (%)	Rank	No.	Freq. (%)	Rank	
<i>Established Home and Health Routine:</i>							
Eating .....	61	15.6		63	17.3		ns
Sleeping .....	18	4.6		17	4.7		ns
Working (errands, chores) .....	13	3.3		24	6.6		0.05
Grooming .....	12	3.1		33	9.0		0.001
Bathing .....	8	2.0		12	3.3		ns
TOTAL ..	112	28.7	2	149	40.8	1	0.001
<i>Play Activities:</i>							
Conflict with children .....	91	23.3		69	18.9		ns
Conflict with adults .....	62	15.9		32	8.8		0.05
Frustration with toys & materials ....	15	3.8		5	1.3		0.05
Frustration by animals .....	2	0.5		1	0.3		ns
TOTAL ..	170	43.6	1	107	29.3	2	0.001
<i>Other Situations:</i>							
Separation from adults .....	53	13.6		25	6.9		0.005
Deprivation of various objects .....	19	4.9		26	7.1		ns
Favoritism .....	9	2.3		2	0.5		0.05
Medical & dental care .....	8	2.0		14	3.8		ns
Fear—strangers & unfamiliar objects ..	8	2.0		2	0.5		ns
School .....	3	0.8		23	6.3		0.001
Teasing .....	6	1.5		1	0.3		ns
Church .....	2	0.5		6	1.6		ns
Performing for visitors .....	0	0		10	2.7		0.005
TOTAL ..	108	27.7	2	109	29.9	2	ns
GRAND TOTAL ..	390	100.0		365	100.0		

total frequency of emotional episodes caused by the miscellaneous situations grouped under "Other Situations." Inspection of these data indicates that some individual situations listed under one of the three broader categories gave rise to a significantly higher frequency of episodes in one of the two age groups. Several situations, on the other hand, resulted in essentially the same frequency of episodes in the two age groups.

A binomial test provided the basis for ranking the three general groups of situations according to the frequencies of emotional episodes that they gave rise to within each age group. Groups of situations receiving the same rank did not differ significantly in the frequencies of emotional episodes ( $p < .05$ ).

The frequencies of the various manifestations of emotional behavior in the two age groups of children are presented in Table 2. A  $t$  test was used in comparing the corresponding frequencies of the two age groups. A

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TABLE 2

MANIFESTATIONS OF EMOTIONAL BEHAVIOR IN TWO AGE GROUPS  
OF FILIPINO CHILDREN

	2-4 YEAR GROUP			5-7 YEAR GROUP			Signif. Level
	No.	%	Rank	No.	%	Rank	
Vocal (sobbing, loud cries, screaming) ..	358	52.4	1	117	24.7	2	0.001
Overt physical aggression against others (kicking, boxing, beating, pinching) ..	137	20.0	2	139	29.3	1	0.001
Overt physical aggression against self (pull- ing hair, tearing clothes, banging head)	38	5.6	3	20	4.2	3	ns
Withdrawal (reporting, murmuring, run- ning away, trembling, grimacing, look- ing ashamed) .....	103	15.1	2	176	37.2	1	0.001
Relatively passive positive reactions (fol- lowing, clinging, insistence, asking for help) .....	47	6.9	3	22	4.6	3	ns
TOTAL ..	683	100.0		474	100.0		

binomial test was used in ranking the five general groups of manifestations as to relative importance within each age group.

The frequency of vocal manifestations was much greater in the two to four year group. The emotional behavior of the five to seven year group, on the other hand, was characterized by significantly greater frequencies of overt physical aggression against others and withdrawal. It should be noted that the frequency of behavior of the withdrawal type was practically two and a half times as great in the older group as that encountered in the younger group. There were no significant differences in the frequencies of

TABLE 3

REACTIONS OF ADULTS

	2-4 YEAR GROUP			5-7 YEAR GROUP			Signif. Level
	No.	%	Rank	No.	%	Rank	
Indulgence (giving in, bribing, compromis- ing, promising, flattering, enticing, etc.)	276	58.9	1	220	45.2	1	0.001
Verbal (threatening, scolding, commend- ing, shouting) .....	97	20.7	2	137	28.1	2	0.01
Overt physical aggression toward child (slapping, pinching, forcing, dragging)	60	12.8	3	95	19.5	3	0.01
Other disciplinary measures (deprivation, isolation, favoritism) .....	11	2.3	4	23	4.7	4	0.05
Relatively passive reactions (ignoring, staring, noninterference) .....	25	5.3	4	13	2.7	4	0.05
TOTAL ..	469	100.0		488	100.0		

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overt physical aggression against oneself and relatively passive positive reactions.

The reactions of adults to the emotional behavior of children are presented in Table 3. In this study, the adults included parents, relatives, and domestic help that were in close contact with the children at the time that emotional episodes took place. A *t* test was used in making the comparisons between the two age groups, while a binomial test was employed in ranking the groups of adult reactions within each age group.

The adults were significantly more indulgent toward the younger group. Conversely, they tended to be significantly more verbal and exercised more overt physical aggression and disciplinary measures toward the older group.

### DISCUSSION

The results of the present study can be better understood when viewed against the background of Filipino culture. The prevailing authoritarian pattern places great emphasis on obedience. Respect for elders is often carried to the extreme of prohibiting expression of opinions by children. Consequently, submissiveness is equated with good behavior.

It should not seem contradictory, however, that in spite of the above considerations allowances are made for age. Adults tend to be more indulgent toward younger children, as is brought out in Table 3. As children grow older and approach school age, they are increasingly expected to conform to the dictates of their elders. Older children are treated as miniature adults; they are expected to conform to a pattern of being seen but not heard.

As the child grows older, training in established home and health routine is emphasized. This is illustrated by the increasing frequency with age of emotional episodes attributable to established home and health routine (Table 1).

The increased consciousness with age of intense adult disapproval of quarreling helps explain the findings presented in Table 1, in connection with play activities. Those data indicate that emotional episodes arising from conflicts with children and with adults tend to decrease with age, the difference being statistically significant only in the case of conflicts between children and adults.

It was brought out (Table 2) that as the child grew older the manifestations of emotional behavior became increasingly directed and correspondingly less irrelevant in nature. The older child was significantly less vocal and considerably more aggressive than the younger one. Superimposed on this series of changes, the pressures exerted on older children as a result of cultural values and norms are much more pronounced. Fear of punishment for being aggressive, as well as an effort to win adult approval, apparently account for the increased frequency of substitute behavior, such as withdrawal behavior encountered in the older group.

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### SUMMARY

The objectives of the present study were to compare two age groups of Filipino children, two to four and five to seven years of age, with respect to (a) the situations causing emotional episodes, (b) the manifestations of emotional behavior, and (c) the reactions of adults to these episodes.

The major findings of the study were:

1. Established home and health routine gave rise to a significantly larger frequency of emotional episodes in the five to seven year group.
2. Play activities resulted in a significantly larger frequency of emotional episodes in the two to four year group.
3. The emotional behavior of the two to four year group was primarily manifested vocally while in the five to seven year group emotional behavior was characterized by withdrawal and overt physical aggression against others.
4. The adults were significantly more indulgent toward the younger group.

The results are interpreted against the background of Filipino culture.

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## PHYSIOLOGICAL INSTABILITY DURING ADOLESCENCE

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Several investigators (6, 18, 27, 29) have suggested that adolescence is characterized by a temporarily increased physiological instability. Bierring's (5) cross-sectional data for preadolescent and adolescent boys imply the contrary, for they show decreasing coefficients of variation as age increases. This paper considers the question of physiological instability during adolescence by examining longitudinal data from the Adolescent Growth Study (19). In addition, it summarizes previously published findings about physiological instability at other ages.

### PREVIOUS FINDINGS

#### *Basal Metabolic Rate*

At the time normative standards for basal metabolism were established, a few investigators attempted to evaluate individual variation by making repeated measurements on the same individuals. The number of subjects in most of these studies was small. Berkson and Boothby (4) utilized 15 consecutive measures of basal metabolism made over periods of not longer than three months on 10 adult females and 23 adult males. The mean of the distribution of the individual standard deviations was 1.33 cal./sq.m./hr. for males and 1.61 for females; the corresponding coefficients of variation were 3.5 per cent and 4.7 per cent. In the same paper these writers give the standard deviations and coefficients of variation for cross-sectional measures of many hundreds of adults as 2.58 cal./sq.m./hr. for males (C.V. = 6.7 per cent) and 2.42 cal./sq.m./hr. for females (C.V. = 6.9 per cent). Berkson and Boothby also recalculated data from a number of earlier studies which included repeated measures on from one to 17 subjects. In general, the individual variabilities so calculated were of the

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same order as the ones for their own subjects. Benedict (3) reported the individual ranges in BMR of 35 adult males tested on from five to 53 different days over periods of from five days to four years and five months. Expressed as proportion of the minimum rate, the individual ranges varied from 3.5 per cent to 31.3 per cent, with a mean of 13.9 per cent. Harris and Benedict (15) calculated the coefficients of variation for distributions of BMRs on each of 11 adult males tested on from 20 to 53 different days. The individual coefficients of variation ranged from 2.3 per cent to 5.3 per cent, with an average of 3.9 per cent. For periods not exceeding 10 to 15 days, the magnitude of the variation was positively correlated with the interval between the observations. Freeman and Giffin (8) made three determinations of the BMR of 50 adult males on two different occasions. The two occasions were often widely separated in time. The test-immediate retest correlation was .76; the test-later retest correlation was .29. Griffith (10) found the average variation between test and immediate retest of BMR to be 1.2 per cent for five adult subjects; the average daily variation from the monthly means was 2.5 per cent.

Herrington (16) took daily measures of several physiological functions on 11 young adult males for 45 days. For BMR, the individual standard deviations ranged from 3.2 to 5.5 cal./hr. The correlation between the individual means and standard deviations was  $.10 \pm .30$ , indicating no relationship between the level and the variability.

Harmon (13) attacked the problem of inter- and intra-individual variability in metabolic rate with an analysis of variance of 12 measures on each of 29 young adult males. Tests were made at 8:00 and 12:00 A.M., and 6:00 and 10 P.M. on each of three different days about a week apart. For basal measures (8:00 A.M.) the between subjects variance was 19.6 cal./sq.m./hr. and the within subject variance (for measures taken at the same time of day on different days) was 4.4 cal./sq.m./hr. Contrary to expectation, the basal determinations were not significantly less variable than other determinations. The test-retest correlations for the three days averaged .56. Harmon concluded that measures of basal metabolic rate are not highly reliable even under the best conditions. One draws similar, though less extreme, conclusions from the paper by Peeler *et al.* (25) which reports correlations of about .65 for measures separated by one to six weeks. In general most, but not all, previous reports (12, 21, 32) of individual variability in BMR have reported an average somewhere between 4 and 8 per cent.

### *Body Temperature*

In another article, using the same young adult subjects, Harmon (14) applies the same analysis of variance approach to the question of variability in oral temperature. The standard deviations for comparable readings upon different individuals at the same time of day and for readings made upon the same individuals at the same hour on different days were about .6° F.

Kleitman and Ramsaroop (22) studied oral temperature variations in six adult males, four adult females, and two adolescent females. The subjects took their own temperatures every two to four hours over considerable periods of time (e.g., 182 days). For a given individual the range for any one hour was often greater than the diurnal variation. The basal temperatures were the least variable, both within and between subjects; individual ranges at 6:00 A.M. varied from 1.3 to 1.5°F. Wright (33) presents graphs of one individual's oral temperatures at 4:00, 8:00, and 12:00 A.M. and 4:00, 8:00, and 12:00 P.M. over a period of three days. The range of temperature at any one hour varied from about .4 to .8°F.

Bayley and Stolz's (2) data for early childhood show increasing stability in body temperature up to age three. The most closely comparable data for ages two to four (23) show no systematic age trend in variability. Comparable data for later childhood and adolescence are not available, but for adults, Horvath *et al.* (17) report the mean individual range for rectal temperatures as 1.2°F. for males and 1.5°F. for females. Their data, obtained under approximately basal conditions, are based on 29 consecutive daily readings on 16 adult males and 38 adult females. The implication is that a fair degree of variability remains present even in adulthood.

#### *Blood Pressure*

The data on individual variability in blood pressure are even more scanty than those on BMR and temperature. Grollman (11) obtained blood pressure readings on one subject of 98/71 on one day and 102/70 four days later. After eight months the same subject's pressures were 100/70 on one day and 98/73 three days later. In a paper dealing with the relationship of auscultatory and intra-arterial pressures, Ragan and Bordley (26) report auscultatory measures taken over several days for each of four adult males. The individual ranges for systolic pressure varied from four to 10 mm. Hg.; for diastolic pressure, from two to six mm. Hg. In Herrington's study the standard deviations of the individual distributions of the systolic blood pressures of 11 young adult males ranged from 3.57 mm. to 6.93 mm. over a period of 45 days. The correlation of the means and standard deviations was .13, indicating no relationship between level of systolic blood pressure and variability. Graham, Hines and Gage (9), who followed several hundred children over a 10-year period, report an increasing standard deviation with increasing chronological age. Unfortunately they analyzed their data cross-sectionally rather than longitudinally so that intra-individual variability cannot be determined.

#### *Pulse Rate*

The individual standard deviations for the pulse rates of Herrington's subjects ranged from 2.6 beats/min. to 5.5 beats/min. The correlation between means and standard deviations was .42. Herrington comments,



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"It is not surprising to find that the pulse rate, which is certainly the most labile of these functions, shows a somewhat higher relation than the remaining variables" (16, p. 134).

Grollman (11) reports repeated pulse rates of two subjects, one measured under stringent laboratory conditions, the other under less controlled conditions. For the first subject, differences between measures separated by three days ranged from 0 to 4 beats; over a period of a year and a half the range was 8 beats/min. For the second subject, the range of differences between measures separated by three days was 10 beats/min.; over a period of 10 months the range was 12 beats/min. Palmer *et al.* (24) counted the pulse rate of one adult male on six consecutive days. The range for these six days was 4 beats/min.; the differences between any two successive days ranged from .5 to 2.0 beats/min.

Sutliff and Holt (31), in a summary of early data that is still used as a standard for textbooks (18), remark that "variability of pulse rate under basal conditions is greater in children than adults, and greater in females than males." Since the early material was almost exclusively cross-sectional, the question of age differences within individuals remains unsettled.

### *Summary of Previous Findings*

The single most appropriate summarizing statement is that for all the measures discussed the amount of information about individual variation is woefully small—so small as to give little ground for generalizing about age trends. Despite this fact, and despite the fact that data have been analyzed in such a variety of ways that comparisons are very difficult, a few generalizations about BMR and body temperature are possible.

For BMR the correspondence between pairs of measures decreases as the interval between measures increases (8, 10, 13). For intervals up to about three months the coefficient of variation for BMR measures of the same individuals appears to lie somewhere between 3 and 5 per cent (4, 15). This is in the neighborhood of 1 to 2 cal./sq.m./hr. Griffith's five cases and Freeman and Giffin's correlation of .76 suggest that the immediate test-retest reliability of BMR is satisfactory. But Harmon's correlation of .41 for a two-week interval and Freeman and Giffin's .29 for a longer period indicate that even in adults many changes are to be expected in an individual's BMR when the measures are separated by any considerable period of time.

For body temperature Bayley and Stolz's data show increasing stability during the first three years, but the individual ranges in basal body temperature for Kleitman and Ramsaroop's older subjects varied from 1.3° to 1.5° F. And Horvath *et al.* report *mean* ranges of about the same magnitude. The individual variability of measures taken under other than basal conditions is even larger. Thus, just as for BMR, we may expect even adults with their hypothetical "stability" to show a rather sizable variation in body temperature.



For pulse rate and blood pressure the only generalization justified by the data so far published is that some individuals vary more than others!

#### THE PRESENT INVESTIGATION

##### *Subjects and Procedure*

Fifty boys and 50 girls from the physiological panel of the Adolescent Growth Study<sup>1</sup> (19) constitute the sample. Insofar as possible, physiological measures of each subject were taken at six-month intervals between the ages of 11.5 and 17.5 years. Of the many physiological indices available, those which seemed most likely to exhibit intra-individual changes in stability associated with adolescence were BMR, body temperature, systolic and diastolic blood pressure, and pulse rate. At the semiannual testings, BMR was determined three times on each of two successive days; basal oral temperature was taken at least once on two successive days; blood pressures and pulse rates were taken after each of the six metabolic determinations.<sup>2</sup>

##### *Methods of Analysis*

Evidence for systematic change in intra-individual variability was sought in two ways: first, by determining the range of each subject's measures for both testing days combined and plotting the mean range against age, and second, by determining for each subject the absolute difference between the medians of his measures on the two successive testing days and plotting the mean absolute difference against age. The first procedure should reveal any *general* change in physiological stability during the adolescent period; the second is aimed at determining whether such a change is primarily a change in diurnal variation. While it is unlikely, there could be systematic change in diurnal variation without a more general effect.

##### *Results*

**Mean range.** Figures 1 and 2 give, for each sex separately, the mean range by age for BMR, oral temperature, pulse rate, and systolic and diastolic blood pressure.<sup>3</sup> Except for temperature, the curves for the two sexes are rather similar for any given physiological function, but the age trends are not the same for all functions. For BMR intra-individual variability declines irregularly, while for pulse rate and the blood pressures there is an increase. For temperature, the boys' variability decreases errat-

<sup>1</sup> Harold E. Jones directed the investigations. Nathan W. Shock supervised the physiological panel.

<sup>2</sup> Details of the procedures are given in (29).

<sup>3</sup> Because of missed examinations the *N* for most of the points on the various graphs is typically nearer to 40 than to 50. At the extreme age groups (11.5 and 17.5 years) the *N*s are small (13 to 24). Points with *N*s of less than 20 have been indicated by dotted lines on the graphs.

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ically and the girls' curve is so unsystematic that chance appears to be the most reasonable explanation. In general, the curves fall into two groups. Those for pulse and the blood pressures tend to parallel each other as do the curves for BMR and oral temperature. The latter parallel is somewhat more marked for boys than for girls. This is not surprising since we have already observed (7) that, for these subjects at least, body temperature

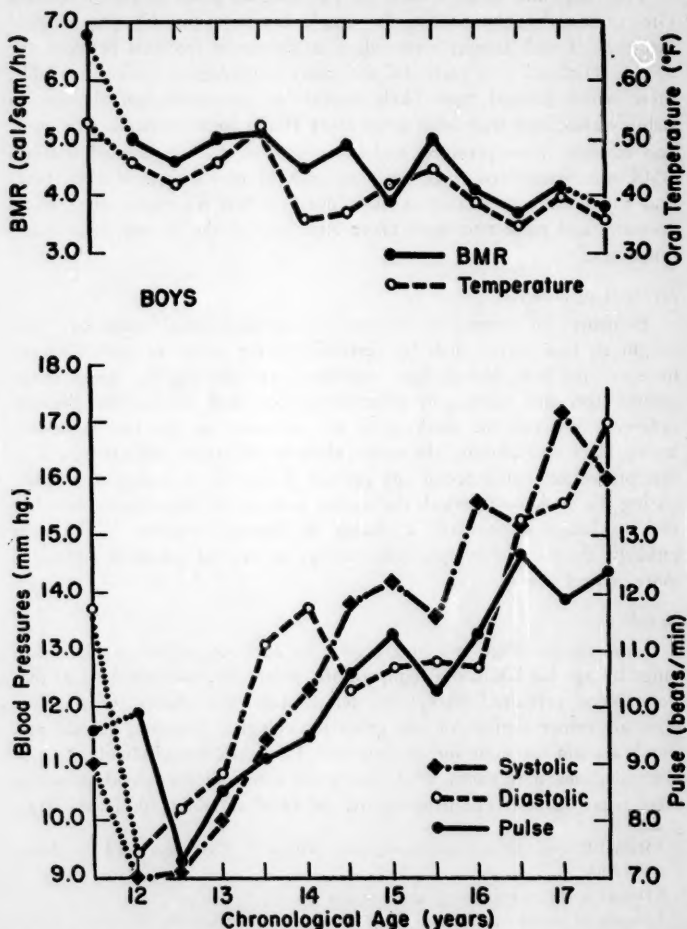


FIGURE 1—Mean range for basal metabolic rate, oral temperature, pulse rate, and systolic and diastolic blood pressure as a function of age—boys.

and BMR are correlated in boys and uncorrelated in girls. Although more of the curves in the two figures show a rise than show a fall, the data do not support the notion that there is a *generalized* physiological instability during adolescence. Rather they suggest that some functions become more stable and others less. Nor do the data support the view that such a hypothetical instability is *temporary*, for in no case does the curve first rise and then fall. It may be, however, that a fall would appear if the data included age 20 and beyond. While the number of adult cases for

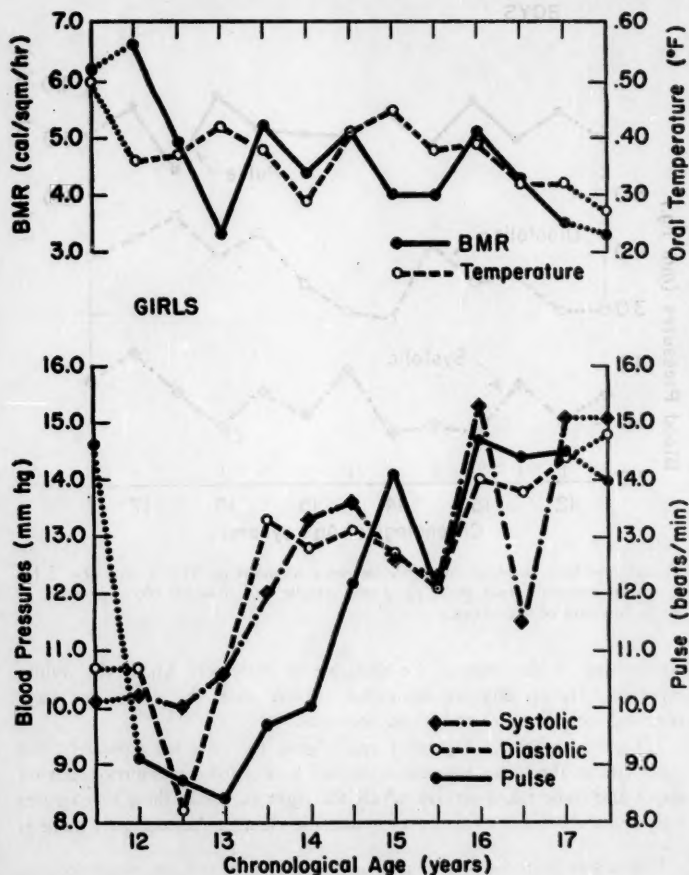


FIGURE 2—Mean range for basal metabolic rate, oral temperature, pulse rate, and systolic and diastolic blood pressure as a function of age—girls.

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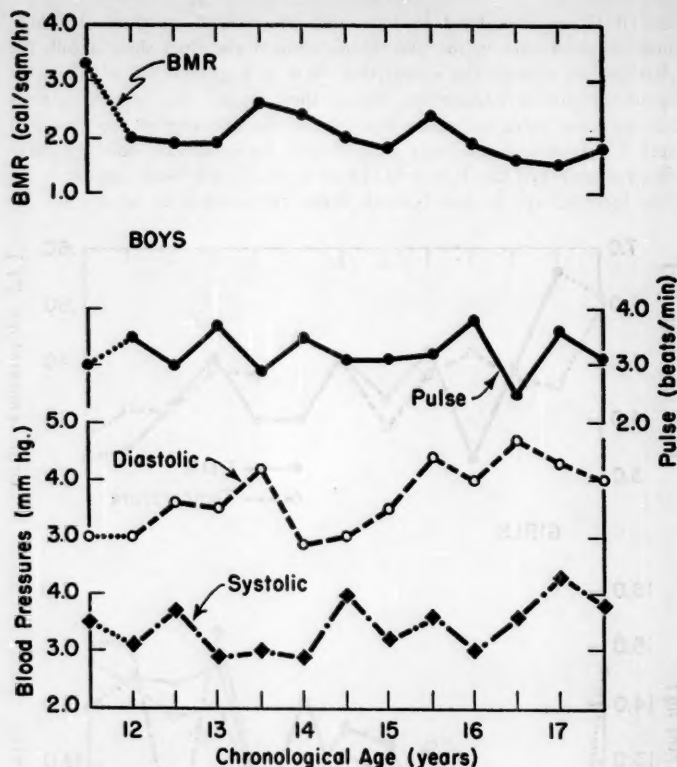


FIGURE 3—Mean absolute difference between medians on Day 1 and Day 2 for basal metabolic rate, pulse rate, and systolic and diastolic blood pressure as a function of age—boys.

whom day to day ranges are available is extremely small, the values reported (11, 24, 26) are somewhat smaller than the values we have obtained for pulse rate and blood pressures.

*Diurnal variation.* Figures 3 and 4 give, for each sex separately, the age trend in the mean absolute difference between the measures taken on day 1 and those taken on day 2.<sup>4</sup> Of the eight curves in these two figures only three show any evidence of systematic change. Among girls there is

<sup>4</sup> There is no figure for body temperature. For many cases only one measure of temperature was taken on each of the two days. To have omitted them would have reduced the number of cases too severely. Consequently we have used only the first measure taken on each day which makes the range identical with the difference between days.

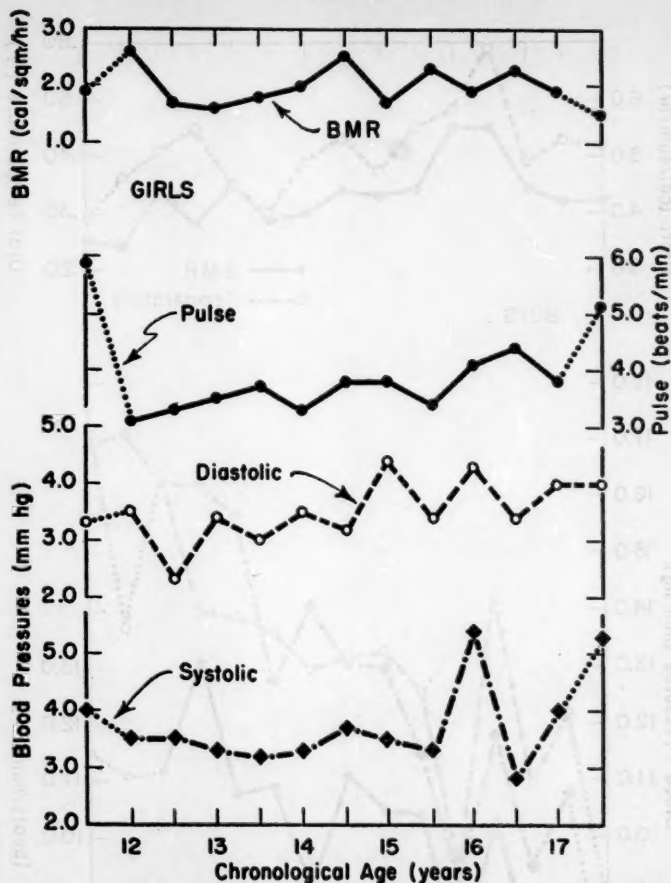


FIGURE 4—Mean absolute difference between medians on Day 1 and Day 2 for basal metabolic rate, pulse rate, and systolic and diastolic blood pressure as a function of age—girls.

a definite but small increase in the diurnal variation in pulse rate. There also appears to be a slight upward trend in the variation in diastolic pressure for girls and a slight decrease in BMR for boys. Otherwise, the curves are so irregular that they suggest no more than chance fluctuations from a horizontal slope. As was true of the curves for the range, these curves of diurnal variation suggest that the answers to questions about physiological stability during adolescence depend upon the particular func-

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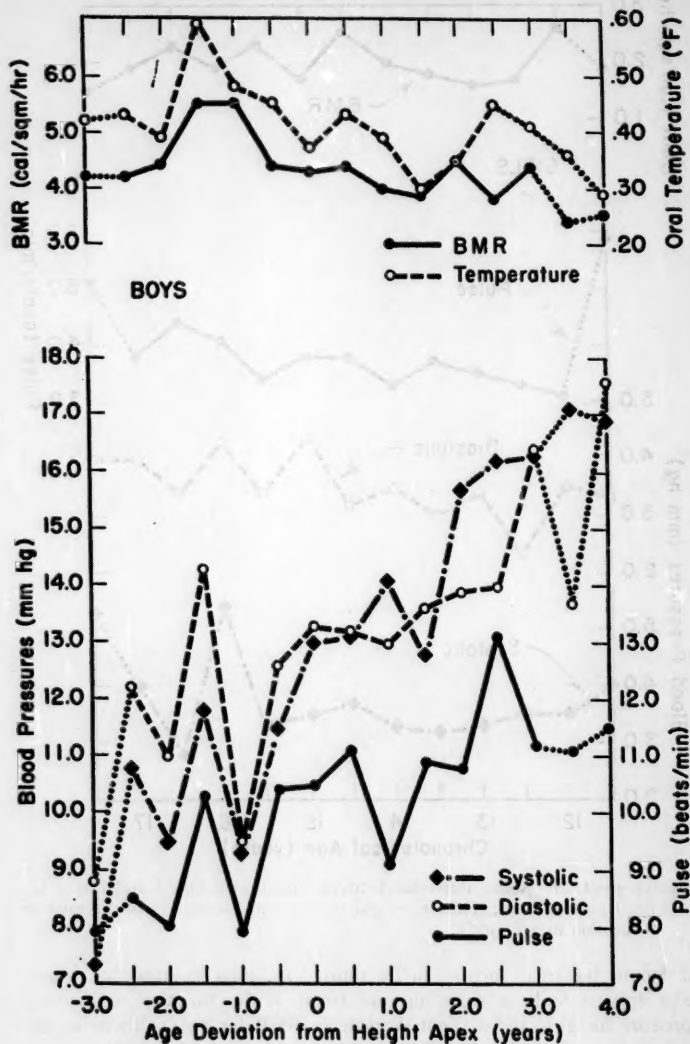


FIGURE 5—Mean range for basal metabolic rate, oral temperature, pulse rate, and systolic and diastolic blood pressure as a function of deviation from the age of maximum growth in height—boys.

tion examined. They certainly do not suggest a *general* increase in individual variability.

*Relationship between intra-individual variability and "physiological age."* Bayley (1), Jones (20), and Shock (28), among others, have demonstrated that for some purposes an index of "physiological age," or maturity, is more useful than chronological age. This should be especially true of physiological studies: individual differences in age and rate of maturing may obliterate systematic changes in variability which would appear if the data were grouped by degree of maturity rather than by chronological age. To examine this possibility we have plotted (Figures 5 and 6) the girls' data against menarcheal age and the boys' against deviation from the age of maximum growth in height (30). Since the previous plots (Figures 3 and 4) of diurnal variation were so unpromising, we give here only the data on the mean range.

We shall consider boys first. Figure 5 again shows the association between pulse and the blood pressures and between BMR and temperature. Furthermore, all five curves show a series of sharp inflections beginning two and a half years before the age of maximum growth. Since the curves are fairly irregular, it is possible that this rise and fall in all five curves is fortuitous. We are skeptical of its significance. Yet the fact remains that grouping the data according to the subjects' maturity rather than their chronological age should tend to eliminate fluctuations due to variations in apparatus and technique. That such grouping should align fluctuations for even a short part of the age span concerned strikes us as a bit surprising. It is a finding that should be tested with another sample of longitudinal measures.

What about girls? Figure 6 gives the mean ranges for girls plotted against menarcheal age. The curves take the same form as those for chronological age. Nothing in the figure suggests a temporary period of general increase or decrease in intra-individual physiological stability. The only menarcheal age at which all five measures increase at once is  $+3.0$ . This is so long after the menarche that we regard it as fortuitous, rather than as a genuine phenomenon associated with adolescence.

### Summary

Physiological data from the files of the Adolescent Growth Study have been analyzed in terms of chronological age and in terms of physiological maturity in an effort to test the hypothesis that adolescence is characterized by a temporary decrease in physiological stability. For systolic and diastolic blood pressure and for pulse rate intra-individual variability increases throughout the period from 12 to 17 or 18 while variability in BMR decreases. Variability in body temperature shows little systematic change. Aside from these over-all slopes, no evidence of a temporary period of heightened variability was found for girls and only a slight indication was found for boys.

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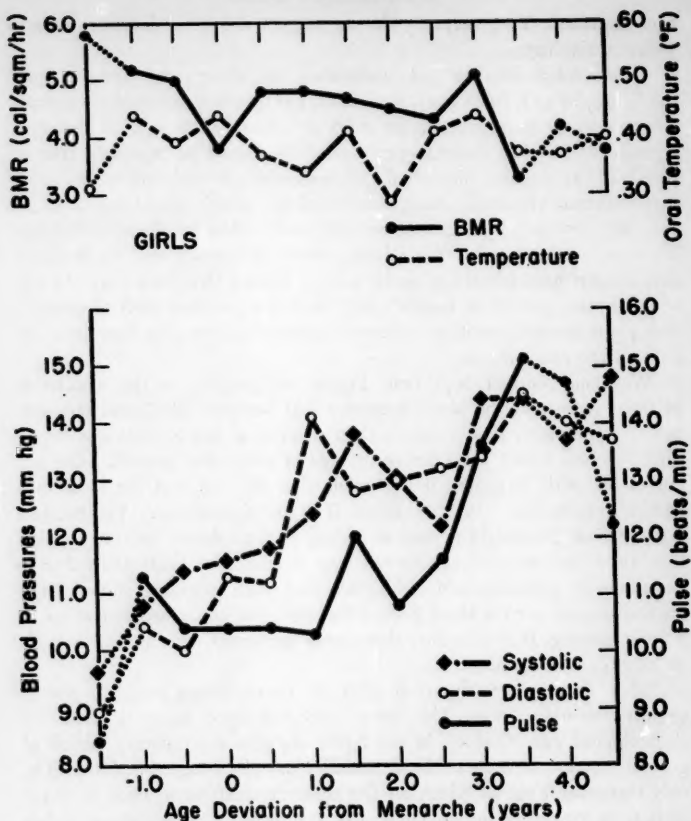


FIGURE 6—Mean range for basal metabolic rate, oral temperature, pulse rate, and systolic and diastolic blood pressure as a function of deviation from the age of menarche.

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## VARIABLES IN EARLY DISCRIMINATION LEARNING:

### I. MOTOR RESPONSES IN THE TRAINING OF A LEFT-RIGHT DISCRIMINATION<sup>1</sup>

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Recently there have been various discussions of perceptual development (4, 8), response factors in learning (7), or early discrimination learning (5) which are in general concerned with an organism's early experience with stimuli and the effects of this experience on subsequent performance. Experiments with both rats (3) and chimpanzees (9) have also demonstrated that early environment is important for later discrimination learning. For practical as well as theoretical purposes it would be valuable to know the type and amount of experience that is necessary, and the time at which it should occur, if the time factor is critical at all. Young children may be particularly good Ss for such research inasmuch as discriminations can be found which they do not normally make and seem to learn only with great difficulty before certain ages. The ability to learn these discriminations may then be taken as a critical indication of the effect of various types of experience in a pretraining situation.

A number of studies have been done (1, 6, 10) following such a plan but, in most cases, the problem presented to the child was simply one of learning which response to attach to each stimulus, inasmuch as the basic distinction among stimuli had probably already been learned.

For the present study a situation was sought where the presentation of differential stimuli apparently aroused no differential responses beyond those involved in receptor activation. This would provide a situation that would coincide more closely with Hebb's notion of early learning and would also fit closely with what others have referred to as perceptual development. A study by Swanson and Benton (11) suggested that left-right distinctions provide a difficult learning task for young children. After

<sup>1</sup> This research was supported by a grant from the research committee of the University of California and by research grant M-1498 from the National Institute of Mental Health, U. S. Public Health Service. I wish to express my appreciation to the staffs of the Small Fry and Peter Pan Nursery Schools for their cooperation in this research.

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some preliminary research indicated that most four-year-olds were not capable of placing differential labels on stimuli that differed only in terms of left-right orientation, this task was chosen as a criterion discrimination.

It seemed possible that the ability to learn to respond discriminatively to stimuli differing in spatial orientation, i.e., left-right, might vary with the nature of the response to be learned. It was presumed that a response like pointing in the same direction in which stick figures were pointing would be easy to learn, and that the acquisition of this response would facilitate the acquisition of other responses. After preliminary research indicated that such a response was indeed easier than the labeling task, this experiment was set up to evaluate specifically the transfer effect from learning a discriminative motor response to the more difficult labeling task. It should be noted that, inasmuch as the direction of the motor response was not varied, no conclusion can be drawn regarding the importance of the symmetrical relationship of that response to the discriminative stimuli.

### METHOD

#### *Apparatus*

The stimuli were two stick figures, with either a left or a right arm raised, each drawn in India ink on a 3 by 5 white card. A duplicate set of cards was available and was substituted during training to make certain that the children were not learning to discriminate dirt smudges or other non-experimental but consistent stimuli.

Two push buttons mounted 12 inches apart on top of a box provided the motor response. Tape recorded children's music through earphones served as incentive and reinforcement. The music was controlled by a foot button and Hunter timer, so that for a correct motor or verbal response *E* pushed the foot button permitting *S* to listen to 10 seconds of the recorded material.

#### *Procedure*

The experiment followed what was essentially an X-Y-X transfer design in which the X task involved training to label the stick figures differentially, and the Y task trained *S* to make button pressing responses in the general direction toward which the figure could be said to be pointing. The control group received only the X, or labeling, training.

Each *S* was asked to come into an adjoining room to play a game. At this time, he was introduced to the earphones and seated in a chair in front of the box. Typically there was some small talk about earphones and airplane pilots. Then, to help accustom the child to the situation, the music was turned on and allowed to play for a minute or two.

To start the initial training on the criterion, or X, task, the music was stopped and the stimuli were placed side by side on the box in front of *S*. He was then asked if he could tell how the two figures differed. None of

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the *Ss* gave any evidence of seeing the difference or of knowing what was meant by the word, "difference." The differences were then pointed out, and *S* was told that the figure with the arm pointing "in this way" would be called "Jack," and the figure with the arm pointing "this way" would be called "Jill," and that the music would come on only if he gave the right name for each picture whenever the picture was presented. The stimuli were presented successively following a randomized order.

For the control group, training proceeded as described above until *S* met a criterion of 10 successive correct responses, or until he quit and refused to return, or until such time as *E* decided to discontinue training. The latter was done only when there was no evidence of learning after at least 80 trials. At intervals from 10 to 20 trials, instructions were given again, pointing out the relationship between the names and directions in which the arms were pointing.

The experimental group first received 20 trials of the same training as the control group with instructions repeated after the 10th trial. After this initial training on the control task, the experimental *Ss* were instructed to push the button toward which the stick figure was pointing, and the appropriate button for each stick figure was indicated by *E*. The experimental *Ss* were trained on this task to a criterion of 10 successive correct responses and then returned to the labeling task. Two of the nine children who were given the experimental treatment went back to the original task in the same session. Seven *Ss* came back on a second day one week later, and were given 10 more button pressing trials before returning to the labeling task.

### *Subjects*

Twenty-eight children were divided into two groups, matched for mean CA of four years and four months and range from three years, eleven months, to four years, nine months. The training procedure was assigned to each *S* by the toss of a coin. There were seven girls and seven boys in each group.

## RESULTS

A contingency table showing the number of *Ss* in the experimental and control groups who were able to meet the criterion of 10 successive correct discriminations in the labeling task is presented in Table 1. The Fisher exact probability test, which tests the hypothesis as to whether two groups differ significantly in the proportion of passes and fails attributed to them, indicates that the null hypothesis can be rejected at better than the .005 level of confidence.

However, it should be noted that three *Ss* in the control group were able to perform the labeling task without the experimental treatment. The control *Ss* can be categorized roughly into three groups: first, three who performed at a high level from the beginning and completed the criterion

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TABLE 1

CONTINGENCY TABLE SHOWING NUMBERS IN CONTROL AND  
EXPERIMENTAL GROUPS PASSING AND FAILING THE  
LABELING TASK

	<i>Pass</i>	<i>Fail</i>
Experimental .....	13	1
Control .....	3	11

within 30 to 40 trials; second, four who refused to continue after rather limited number of trials and five who refused to return after low success in the initial session; third, two who continued to come back with no evidence of ever responding above chance.

Inasmuch as the labeling task proved to be less difficult than was indicated by other studies (2, 11), it seemed important to try to identify any members of the experimental group who might learn the labeling task without the experimental treatment, in order to eliminate them from consideration in the final results. Thus, two Ss in the experimental group were given an extra 20 trials on the initial test task because of high performance on the first 20 trials. One of these met the criterion while the other did not, even though the instructions had been repeated before the 21st and 31st trials. Four other children in the experimental group also showed evidence of learning or met the criterion task during the initial 20 training trials.

Table 2 gives a picture of the results if one removes from Table 1 the three Ss of the control group and the five Ss of the experimental group who learned the criterion task so readily that it seems reasonable to assume that they were not examples of early or original learners. This table gives a more striking picture of what has taken place. Again, the null hypothesis can be rejected at the .005 level of confidence. As can be seen, those Ss in the control group who did not show promise of learning from very early

TABLE 2

CONTINGENCY TABLE OF NUMBERS PASSING AND FAILING  
THE LABELING TASK WHEN CHILDREN WHO APPARENTLY  
LEARNED WITH EASE WERE REJECTED FROM  
BOTH GROUPS

	<i>Pass</i>	<i>Fail</i>
Experimental .....	8	1
Control .....	0	11

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in the training did not learn subsequently. In the experimental group, when those who apparently were capable of learning the criterion task with some ease were excluded from the group, thus making this group comparable to the non-learning controls, we still found that all but one of these Ss learned the criterion task quickly after the experimental treatment. The one S who did not learn was performing consistently above chance (eight out of 10, and nine out of 10 in the last 20 trials) but was apparently too distractable to meet the criterion of 10 successive correct responses. It should be noted that in the experimental treatment four Ss performed perfectly after instructions alone, four Ss completed the criterion in 20 trials, and one took 30 trials. Subsequent to this training, seven Ss completed the criterion on the test task within 20 trials, one completed the criterion within 30 trials, and, as mentioned above, one failed to meet the criterion within 50 trials and training was discontinued.

#### DISCUSSION

The exploratory nature of this research makes it hazardous to discuss it on a theoretical level. The left-right discrimination is really somewhat easier than had been expected. Thus, it is probably gratuitous to suggest that we are getting at early learning in the sense that we had hoped. We are now working with pitch discrimination which appears to be almost universally difficult and better meets our criterion for early learning. From this experiment, however, it seems reasonable to conclude that some discriminations that may be difficult for children to make can be simplified so that the child can learn the simpler task, and that, as the result of learning the simpler discrimination, performance may be facilitated in more complex situations.

Simplification can be specified in both the stimulus and response dimensions. In this experiment the response was simplified. What will happen if the stimulus dimension is manipulated remains to be demonstrated. It may be that exaggerating the differences between stimuli in order to simplify them may have the net effect of eliciting a response more easily. Thus, in the present experiment lengthening the arms of the stick figures might have increased the number of successful performances with the naming task by producing in the observing response the sort of distinct stimulation now produced by the button pressing response. It should be reiterated that the button pressing response apparently did more than simply call attention to the appropriate part of the stimuli inasmuch as the importance of the direction that the arms were pointing was demonstrated to S several times during the test trials.

Whether the button pressing served a mediating function was not clear. Preliminary research most definitely indicated that it was not necessary to set up a series of trials attaching names to the buttons. A number of the children, however, obviously used the button pressing response or fractional



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parts of it in learning to apply the names. In one case, a child who had to be told twice to discontinue the button pressing started lifting the appropriate shoulder for each stimulus before applying labels. Other children would look at the appropriate button before supplying the name of the figure. The majority, however, displayed no obvious remnant of the motor response when learning the names. Further research manipulating both stimulus and response variables is obviously a necessity before one speculates further about the basic processes involved or about other levels of mediation.

At a practical level, these data can be interpreted as having fairly direct implications with regard to specific instruction, such as teaching of reading. Research by Davidson (2) has indicated that children are not normally capable of discriminating "b" from "d" until seven and one-half years of age. The present data indicate that a child incapable of performing this discrimination at a given time can be taught it very quickly, even as early as four years of age, if conditions are properly arranged.

The recommendation to delay training after the failure of children to meet certain readiness criteria probably arises from observations of the frustration produced when children attempt to learn discriminations that are too difficult for them, rather than from knowledge of the processes involved in discrimination learning. The refusal of a number of the children in this experiment to remain in the situation under conditions providing 50 per cent reinforcement was striking when compared with the extended periods of time others spent if success was relatively high. Four-year-old children have already learned to label such performance as failure and react by withdrawing from the situation. However, it should be noted that the situation in general was sufficiently reinforcing, if success was relatively high, to keep children in the experimental situation for extended periods of time and also to keep them coming back on subsequent days. Furthermore, these children were from schools which attempted to minimize the importance of high performance and competition. Thus, it undoubtedly is wise not to push the child when he has difficulty. However, the present study suggests that one can continue training at a different level and thus achieve the desired results without concomitant frustration.

## SUMMARY

An experiment was devised to test the facilitative effect of attaching simple motor responses to stimuli differing in spatial (left-right) orientation on the subsequent labeling of these stimuli. Four-year-old children were used as Ss and it was found that, except for a few children who learned the labeling task with ease, the majority of four-year-olds found the task essentially impossible.

The experimental treatment of learning to press buttons oriented in the directions the stick figures used as stimuli were pointing was readily learned



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by all Ss in the experimental group and this training was found to have a significant effect on subsequently learning to apply labels.

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## RORSCHACH BEHAVIOR AND PERFORMANCE OF HIGH AND LOW ANXIOUS CHILDREN<sup>1</sup>

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The present article deals with the performance and behavior of high anxious (HA) and low anxious children (LA) in the Rorschach situation. This study is part of an ongoing research project on the measurement and correlates of anxiety in school age children. Previous reports (3, 6, 7, 8, 9) from this project have described the construction of Test Anxiety (TA) and General Anxiety (GA) Scales and, in addition, presented data indicating that these scales had an encouraging degree of validity.

In an attempt to explore further the validity of these scales we chose the Rorschach situation because it is one in which the child has to solve problems involving culturally unfamiliar stimuli with practically no aid or direction from another person. The method of administration with its underlying rationale has previously been described by Sarason (5, p. 111). It should be emphasized that the method of administration involves no questioning or prodding in the performance and very little questioning in the inquiry. Briefly, our expectations were that in a problem-solving situation in which the child is required to make his own decisions, there would be more signs of interference and ineffectiveness in the functioning of the HA child than in the case of the LA child.

### SUBJECTS

Thirty-two pairs of subjects were matched for grade, sex, and average verbal and nonverbal T-score on the Otis Quick-Scoring Mental Ability Test (Alpha). They differed in that one member of each pair was in the

<sup>1</sup> The project of which this study was a part is being supported by a grant from U.S.P.H.S. We wish to express our deep appreciation to Iris B. Keim and Joan Bliss for their aid in this study.

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fourth quartile of scores on Test Anxiety and General Anxiety Scales (the HA subject) while the other member of the pair was in the first quartile (the LA subject). There were 16 boys and 16 girls in each of the two anxiety groups. The 32 pairs were drawn from a sample of 747 subjects in grades 1 through 4, who had been given the anxiety questionnaires several months earlier. At the time of the Rorschach the subjects were distributed in grades 2 through 5. The total sample of 747 excluded subjects with a known academic or behavior problem and those whose parents were divorced or separated.

### PROCEDURE

The Rorschach testing was done by two female examiners. Following the inquiry of each response, the subject was given a piece of tracing paper with the request to trace the response so that the examiner "could see it just as you did." After the test was over, a description of the subject's behavior was written, averaging approximately one and one-half double-spaced pages in length. These behavior descriptions were not made with any fixed schedule of traits in mind. The examiners were told to describe what to them were the dominant characteristics of the child's behavior, and also to include their own spontaneous reactions to the child's behavior.

One of the writers (S.B.S.) spent approximately 20 to 40 minutes in a somewhat superficial clinical analysis of each protocol (including the behavior description). Brief notes were made during the analysis, and in each case a judgment was made as to whether the subject was HA or LA, i.e., whether the child answered the questionnaires as an HA or LA subject. Following this, the 64 records were arranged for the clinician into the 32 matched pairs with the purpose now of re-evaluating the previously recorded judgments and making whatever changes seemed indicated when examining each member of the pair together, the group to which each member belonged still being unknown to the clinician. The comparison of the matched pairs was done before the results of the first analysis were known.

The clinical analyses were based both on theoretical conceptions concerning anxiety as well as the particular psychologist's clinical experience with children. Therefore, the major criteria employed subjectively by the clinician were then explicitly stated and tested statistically.

The protocols were also scored in the conventional manner, using Hertz's (4) manual as a guide. The two Rorschach examiners independently scored 10 protocols and agreement on 73 per cent of the responses was obtained. Each of the remaining 54 protocols was then scored by both examiners in conference. Where there was a difference in scoring a response, an additional judge was consulted. It might be helpful to record our opinion that, in the absence of tracings, the scoring of these records would have been markedly less reliable than it was.

In the present study, as in all other aspects of this project, the collection and analysis of the data were done without knowledge of the group to which a child belonged.

## RESULTS

### *Clinical Analysis of the 64 Records*

Forty of the 64 cases were placed in the proper anxiety group, the  $p$  value for this result being .03. When the 64 records were then arranged into the 32 matched pairs with the opportunity to make new judgments, 18 of the 32 pairs were correctly categorized, this result being significant at only the .30 level. The clinician making the judgments experienced great difficulty with 12 of the matched pairs, these pairs containing cases who in the previous analysis had also been a source of difficulty. In making his final judgment with these 12 pairs the clinician explicitly indicated that he was making his judgments with much doubt. *The doubt did not concern the judgment about the subject's anxiety in the Rorschach situation but whether or not the subject would admit to anxiety on the questionnaires.* It should also be noted that all judgments on the non-questioned pairs took approximately 30 to 45 minutes. In the 20 pairs which were not questioned, 15 were correct ( $p = .03$ ). (The above  $p$  values were obtained using the sign test procedure.)

When these results were known, the clinician then reviewed the incorrectly matched pairs in order to determine, if possible, the reasons for the mismatching. It quickly became clear that there were a number of individuals in these pairs for whom the examiner explicitly had used such phrases as: "He is a very guarded child," "I felt I had no rapport at all with this child," "He was very defensive and I don't know what was going on inside." It also seemed as if it was largely LA cases who were so described and that such behavior was interpreted by the clinician as a reflection of anxiety in the child. The two examiners independently then read each of the 64 behavior descriptions with the instruction to put each child into one of two categories: The child was clearly of the "guarded" type or he was not. There was complete agreement in 13 cases that the child was guarded. There were six cases where one examiner categorized the child as guarded while the other examiner had not, although the latter judge explicitly questioned her own categorization in these six instances. There was no instance where one examiner judged a child as guarded while the other examiner clearly did not.

The 13 cases in which there was complete agreement were largely LA (nine LA vs. four HA) and included seven children who were members of mismatched cases. Of the six cases where there was partial agreement about the child's guardedness, four were HA and two LA, with only one a member of a mismatched pair. In other words, of the 12 pairs which the clinician had mismatched and about which he had felt great uncertainty in judging, eight contained a child who was guarded or defensive or with

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whom the examiner could not establish rapport. Six of the eight were LA cases labelled HA by the clinician. It would seem, therefore, that one of the sources of error in matching was the child who admitted to little or no anxiety on the two scales but whose guarded behavior in the Rorschach situation was interpreted by the clinician as symptomatic of anxiety. From the inception of this project we had assumed that, if a child received high scores on both scales, we could place greater credence on his report than on that of the child who admitted to little or no anxiety. The analysis of the mismatched supports this assumption.

### *Criteria Employed by Clinician*

What follows here concerns those criteria which the interpreting clinician employed and could state in a way so as to make statistical testing possible. The interpretive process is too complex and too little understood and studied to expect that, at this point at least, one can do other than evaluate aspects of the process. It is easy for a clinician to say that he employed a criterion, but it is extremely difficult for him to indicate how he weights it when other criteria are present in varying degrees.

*Rejection of cards.* The inability to respond is perhaps the most blatant indicator of interference in response. In the HA group 13 of the 32 cases rejected at least one card while in the LA group there were six such cases. A chi square analysis resulted in a  $p$  value of .05. (This and all subsequent  $p$  values are based on a one-tail test.)

*Minus response (F-/R).* This measure reflects the degree to which an individual's responses do not correspond to the stimulus area employed. In a chi square analysis in which the cut-off point was the median of the F-% distribution, significantly more HA were above the median ( $p = .025$ ). When the vague responses were taken into account the differences between the groups disappeared, contrary to the clinician's expectations. In other words, to the extent that the clinician attributed the same weight to giving many vague responses as to a high F-%, he was reducing his valid discriminations between the two anxiety groups.

*Total number of responses:* The expectation that anxiety would interfere with output is, of course, similar to the expectation concerning card rejections. In a chi square analysis there was a tendency for HA subjects to give fewer responses ( $p = .05$ ). When cases in the two anxiety groups who rejected cards were excluded from the analysis, the probability level remains the same.

*Anatomy responses.* It is assumed that the high anxious individual is one who, consciously or unconsciously, is or has been concerned with body adequacy or integrity, and that such concern will be reflected in the content of responses. The following are examples of anatomy responses: skeleton, inside of somebody, X-ray, lungs, person's breast, tonsils, etc. Thirteen HA individuals gave at least one anatomy response while six in the LA group did so ( $p = .05$ ). For reasons similar to those above, it was

expected that more HA than LA individuals would give responses in which somebody or something was explicitly killed or damaged. There was no difference at all between the groups in this type of content.

*Active aggressive responses.* It is assumed that the anxious individual tends to perceive himself as inadequate and has difficulty justifying the direct expression of aggressive feeling (3). On this basis it was expected that more LA than HA individuals would give responses involving fighting, arguing, or a "volcano" percept. A chi square analysis indicated that more LA than HA individuals gave such responses ( $p = .05$ ).

The above results suggest that most of the criteria which the clinician could explicitly state had discriminatory value.

### *Results with Conventional Scores*

More HA than LA individuals were unable to respond at all to any objective property of the cards involving color (chromatic, achromatic, shading), the  $p$  value being .025. Seventeen of the 32 HA cases could not respond to any aspect of color while eight in the LA group could not do so. This finding, which was the only one of the conventional scores which attained or was near significance, can be integrated with some of the findings in the previous section in the following way: in a problem-solving situation containing relatively unfamiliar stimuli to which he must respond independently (i.e., deciding for oneself how, when, and how often to respond) the HA individual will, when he can respond at all, tend to reflect in his responsiveness illogical or irrational ways of thinking, and such responsiveness will tend not to incorporate the obvious properties of the stimulus. This conclusion, which is akin to one by Cox and Sarason (2) in a similar study of college students, suggests that one of the effects of anxiety is to exacerbate to an interfering degree the role of internal and affective factors in outwardly directed responsiveness.

### *Analysis of Behavior Notes*

The first analysis involved a count of those words (e.g., afraid, uneasy, shy, disturbed, etc.) which might be symptomatic of anxiety. Some of these words appeared with too little frequency to warrant any conclusion. For any single word category there were no notable differences between HA and LA groups. When a count was made of the number of different categories in which an individual was entered, there was a tendency for HA boys to be entered in more categories than was the case for LA boys.<sup>2</sup> There was no such difference between HA and LA girls. The only other tendencies which seemed worthy of note concerned HA boys and HA girls: eight or 50 per cent of the HA girls were labeled as "nervous" by the examiner whereas only two of the HA boys were so designated; 11 or 65 per cent of the HA boys were described as uncertain or unsure of

<sup>2</sup> In the analyses previously presented there were no sex differences which were significant or approached significance.

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themselves in this situation, whereas only three HA girls were so described. No such differences were found between LA boys and girls. It may be that a word like "nervous," on the one hand, and words like "unsure" and "uncertain," on the other hand, did not in fact signify different kinds of behavior. However, it is our impression from the context in which these words appeared that "nervous" signified a general impression of the examiner (e.g., "a nervous type of child," "a nervous, high strung child") whereas "unsure" and "uncertain" seemed to refer more specifically to reactions to the problem-solving task.

In order to check further on the behavioral differences suggested above, a count was made of the number of questions which the child asked the examiner during the performance part of the Rorschach, that part during which the examiner was most nondirective and the factor of unfamiliarity of the stimulus task presumably most strong. We were interested in such a count because we assumed that the asking of questions reflected not only dependence but uncertainty as well. It was found that three HA girls asked questions whereas nine HA boys did so. This suggests that the label "nervous" in connection with HA girls may well reflect behavior different from that signified by "uncertainty and unsureness" in HA boys. In the other anxiety group six LA girls and three LA boys asked questions. Again we found that the differences between HA and LA boys were greater than between LA and HA girls.

A further analysis, relevant to the above, concerned the child's handling of the tracing of each of his responses. The focus here was whether a child said he could not or did not know how to trace a response, or stated that he was not satisfied with what he had traced, or where the examiner explicitly stated that the child was concerned in some way with having to trace his responses. As in the previous analyses it was the HA boys who experienced difficulty with tracings: nine HA boys vs. four HA girls, and four LA boys vs. five LA girls. In going over the count it became apparent that some children had been described by the examiner as being concerned either if in tracing they tended to check their tracing with the blot or if they took back the tracing from the examiner in order to add something that had been forgotten. Since such behavior seems much less clearly indicative of concern than a child's own statement of concern, a similar count was made excluding these cases. In the new count there were eight HA boys vs. two HA girls, and two LA boys vs. four LA girls. The tendency for differences to appear between HA and LA boys, but not between HA and LA girls, remained.

## DISCUSSION

We have already indicated that we chose the Rorschach situation because it is one in which the child had to decide for himself how to handle a problem-solving task containing relatively unfamiliar stimuli. We might



put our intention in another way. We were attempting to increase the possibility that a child would experience a situation as one of danger in that external support for the handling and fulfillment of his needs would be minimized or nonexistent. Because it is in such a situation that anxiety should be experienced, it was predicted that an HA group would be more adversely affected than would the LA group. We evaluate the findings we have presented as supporting such a prediction. It seems appropriate to indicate at this point that the findings of the present study are similar to those obtained with HA and LA college students, despite the obvious differences in the nature of the two samples (2).

One of the most thorny problems in the development of truly discriminating personality questionnaires, especially when the subject is asked to reveal what may be termed weaknesses, is that the subject can wittingly or unwittingly give an invalid response. The findings in the present study in relation to the "guarded" child underlines the importance of the problem but throws relatively little light on two questions. How can one pick out from questionnaires the child who admits to little or no anxiety on the questionnaire but whose overt behavior in relevant situations suggests the experience of anxiety? How can one discriminate between the child who consciously gives an invalid low score and the one whose perception and remembrance of his test behavior is subject to defensive distortion? In an attempt to explore this problem a "lie" scale consisting of 11 items was developed and embedded in the general anxiety scale. Each of these 11 items was specifically concerned with the lie tendency in relation to anxiety or worry (e.g., "I have never had a scary dream," "Do you ever worry?"). The correlation between lie and anxiety scores tended to be of such size (ranging from  $-.65$  to  $-.75$ ) that one could not assume that the two scores were measuring different things. This finding is markedly at variance from that of Castenada, McCandless, and Palermo (1) who found practically no correlation between anxiety and lie scores. It is important to point out that whereas our lie items specifically concerned anxiety their items were more omnibus in nature. It is our opinion that it is erroneous to assume that the lie or defensive tendency is not dependent on the content area (e.g., anxiety, aggression, cheating) about which one is questioning the subject. If the lie items concern cheating or kindness, and the scale in which they are embedded concerns anxiety, there is no compelling *a priori* reason to expect a significant correlation between the lie and anxiety scales. It would seem that until more thought is given to the theoretical rationale and methodology of the measurement by questionnaire of different kinds of defensive tendencies the clinical and research utility of personality questionnaires will be limited.

An important problem suggested by this study stems from the suggestive trend in the behavior notes, namely that the overt behavior of HA boys seems to reflect anxiety differently from that of HA girls. In addition, the overt behavior of HA boys seemed different from that of LA boys

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whereas no such trend was discernible between HA and LA girls. Although these trends may be unreliable because of the small number of cases upon which they are based, we presented the behavioral data because of their possible significance for other of our findings. Twenty-four of the 32 matched pairs of subjects were also utilized in a learning study (8). In that study significant differences between HA and LA subjects were found but the difference between the HA and LA boys was notably larger than that between HA and LA girls. In addition, although girls rather consistently get significantly higher anxiety scores than boys, the correlation between anxiety score and score on conventional group tests of intelligence is no higher among girls than among boys. One possible implication of these different findings is that a high anxiety score does not have the same psychological significance in a boy as in a girl. We have elsewhere (7) advanced the hypothesis that our culture makes it much more difficult for a boy than for a girl to admit explicitly to anxiety (or weakness). For a girl to admit to anxiety is not as likely to impair her own or others' evaluation of her femininity as a similar admission in a boy would impair his own or others' evaluation of his masculinity. If this is correct, one might expect that the anxiety which the HA girl admits to on the questionnaires does not have as interfering an effect on her problem-solving behavior as in the case of the HA boys. The fact that boys get lower anxiety scores than girls—which we interpret as a reflection of a kind of learned defensiveness or suppression in boys—would suggest that the boy who does get a high score is one who has difficulty handling his anxiety. The finding in the present study concerning the dependent behavior of HA boys fits in with such a hypothesis.

## SUMMARY

The Rorschach was administered to 32 high and 32 low anxiety children who were matched for grade, sex, and IQ score. A relatively brief and blind clinical analysis (case-by-case) by a clinician resulted in significant discriminations between the two anxiety groups. In a matched-pair analysis the discrimination was not significant. Further analysis revealed that one of the sources of error in matching was the child who admitted to little or no anxiety on the anxiety scales but whose guarded behavior in the Rorschach situation was interpreted by the clinician as symptomatic of anxiety.

In contrast to the low anxious subjects, the high anxious rejected more cards, gave fewer responses, gave fewer responses with aggressive content, gave more responses with anatomy content, and responded less to any aspect of color (chromatic, achromatic, shading). An analysis of the behavior notes suggested that the HA boys are more easily differentiated from the LA boys than are the HA girls from the LA girls. The HA boys present a rather clear behavioral picture of indecision and dependence.

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The results of this study are discussed in terms of (a) their implications for the measurement of defensive tendencies as they affect questionnaire taking and (b) the possibility that identical scores (e.g., a high score) in boys and girls have different psychological significances.

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## CLASSROOM OBSERVATIONS OF HIGH AND LOW ANXIOUS CHILDREN<sup>1</sup>

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This study is part of an ongoing project concerned with the development and correlates of anxiety in children of school age. Specifically, the present study involves the direct classroom observations of high (HA) and low (LA) anxious children, anxiety being defined here by high scores both on a test anxiety scale and a general anxiety scale previously described (1, 3, 4). In the initial phases of this project the focus was on the development of the two scales and the establishment of their face validity. In the present phase the focus has been on the study of 32 matched pairs of HA and LA children in the following ways: an experimental learning situation (5), the Rorschach (2), parental interviews (1), and direct observations in the classroom.

A number of different problems were encountered in attempting to develop a methodology for observations in the classroom. In a pretest both an HA and an LA child in the same classroom were observed for approximately three hours by one observer. This was done for eight pairs of children. One child was observed for 15 minutes, the other child for the next 15 minutes, and so on until the noon recess. The aim of the observation was to record as much of the child's behavior as was possible. We assumed that such an aim was presumptuous but we also assumed that it would be better in a pretest to err in getting too many than in getting too few data. As it turned out, however, we encountered a surprisingly restricted range of behavior, the class usually being structured in such a way that there were few times when a child had an opportunity to

<sup>1</sup> The project of which this study was a part is being supported by a grant from U.S.P.H.S. We wish to express our appreciation to Iris Keim and Joan Bliss for their help in collecting the data.

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engage spontaneously in interpersonal contact. Most of the time the child was engaged in directed activity, such as silent reading, preparation of lessons, or attending to what the teacher was doing or saying. There were a few times during each observation when there was interaction between the observed child and the teacher (or another child) the content of which was ambiguous because the observer could not hear or accurately see what was going on.

A limitation of the blow-by-blow type of observation is that it is extremely difficult for someone who reads a protocol to get something which resembles an integrated personality picture. It was our experience that although the observer could integrate the many details into a distinctive personality picture, another reader could not do so because he, unlike the observer, did not have a reservoir of impressions to draw on, i.e., the detailed notes did not have the surplus meanings for the reader that they had for the observer.

We at first thought that our problem would have been much more simple if we had a clearer idea of the kinds of overt behaviors which could and should be observed in the classroom observations of HA and LA children. This was undoubtedly true, but our experiences have indicated that even if we were to begin with well-defined, theoretically-based categories of behavior, one would have to carry out the observations over a relatively long period of time before obtaining frequencies which would justify statistical analysis. The importance of observations extended over time is further emphasized by the variability of a child's behavior. During the course of the pretest as well as the main study we found children whose behavior varied markedly from morning to afternoon, from one day to the following day, and in a few instances, unaccountable changes in behavior within a single observational period. Aside from these presumably intraindividual variations we also encountered the situation where a child's behavior on a second observation was different from the first because of an unusual external occurrence, e.g., the regular teacher was absent, or a remedial specialist took over the class.

Because the 32 matched pairs of HA and LA children had to be observed (and tested) within a limited period of time, and because it seemed apparent to us that the development of a refined methodology would not be a task of short duration, we decided to observe each child for one hour at the end of which time the observer was (a) to describe the major events which had occurred and (b) to write as integrated a personality description as was possible from such a brief observation.

## SUBJECTS

The 32 pairs of HA and LA children were matched for sex, grade, and locally standardized T-scores on the Otis tests of mental ability. They differed in that the HA subjects were drawn from the top quartile of scores

on both the test anxiety and general anxiety scales while the LA subjects were drawn from the bottom quartile. The scales were administered in the previous year when the children were in grades 1 to 4; the observations were made when the children were in grades 2 to 5. In each anxiety group there was an equal number of boys and girls. The 32 matched pairs were the same as those used in the Rorschach study (2). In the learning study (5), and for reasons given there, it was only possible to use 24 of the matched cases.

#### PROCEDURE

Two observers were used, and each observed half of the sample. For purposes of establishing observer reliability, 16 of the subjects were observed independently by each examiner on successive days at the same hour of day. As was indicated earlier, each child was observed for approximately one hour after which the description and interpretation of behavior was written. After all children were observed, and the reliability of the observations evaluated, an abstract of each description was prepared. This abstract contained words, phrases, or events which either occurred with greatest frequency in the report or which clearly represented the observer's dominant reaction to the child. The data to be presented below (with the exception of that concerned with reliability) are based on frequency counts of words, phrases or events contained in these abstracts. The observers were never aware of the group (HA or LA) to which a subject belonged.

The HA and LA groups were compared on such variables as need achievement, unintelligible behavior, academic ability, task orientation, motor behavior, and teacher relationships. It should be noted that the observations (and the abstract prepared from them) did not necessarily contain the above phrases but they have here been used because they clearly reflected the words and phrases actually used by the observer. In addition, and as was indicated previously, the presence of these words or phrases in the observations reflected the observer's opinion that these were strong or distinctive characteristics of the child. For example, there may have been times during an observation when a child's behavior was seen by the observer as either "dreamy," or "staring," or "baffling," or "puzzling," but unless the observer had stated in her report that this was a dominant characteristic of the child it was not contained in the abstract and, consequently, he was not counted among those with "unintelligible behavior."

Statistical tests have been omitted in presenting our results, primarily because the number of cases involved in many of the comparisons was, in our opinion, too small to warrant such procedures. If the observations had been based on an explicit schedule so that each of our subjects could have been scored or rated on every variable, the problem of the interpretation of results based on small numbers in each cell of an analysis would

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have been less difficult. For reasons given earlier the observations were not conducted in this manner.

### RESULTS

#### *Reliability*

In the reports of the 16 cases used for establishing reliability, identifying characteristics were deleted. These cases were divided into groups of four, and for each group there were eight reports, two for each child. The groupings were done to minimize differences in intelligence and grade within each group. Within each of the four groups each observer had to match her report with that of the same child made by the other observer. One observer correctly matched each of her 16 reports with those of the other observer. The other observer was successful in 14 of the 16 cases. These results were far better than was expected. From observation of the matching behavior of the observers, as well as discussions with them after the matchings were completed, there seemed no basis for assuming that their degree of success could be attributed to what may be termed artifacts in the reports. A third judge was then given the protocols and he successfully matched 11 of the cases. A fourth judge, who was only able to complete two groups of matchings (i.e., eight cases), matched six of the eight cases correctly. We conclude from these results that the observations of the two observers had satisfactory reliability. It should be pointed out, however, that in most, if not all, of the incorrect matches made by the three judges (one judge had no incorrect matchings) the child's behavior in the two observation periods seemed markedly different.

#### *Need Achievement*

There were eight LA and seven HA boys who can be described as having a pervasive need for achievement either because they were strikingly attentive to tasks, or because of active, eager, energetic and frequent volunteering, or carefulness of work, or evidence of pleasure in good work, or concern with lessons. More often than not the observations of these boys contained more than one of these phrases. Whereas in the case of boys there was obviously no difference between anxiety groups, in the case of girls there were eleven HA and three LA whose observed behavior suggests a strong need for achievement. There were no HA girls who were explicitly described as "not particularly interested or motivated" while six LA girls were so described; among the boys three LA and four HA were so described. It would seem, therefore, that observational data suggestive of a strong achievement need tended to distinguish between HA and LA girls but not between HA and LA boys.

#### *"Unintelligible" Behavior*

In stating that a child has a strong need to achieve, one is clearly relating his behavior to some external task or situation—at least, one



assumes that one understands why a child is responding in a particular way. There were more than a few children whose behavior was unfathomable by the observer and for which such adjectives as "dreamy," "staring," "baffling," "puzzling," and "enigmatic" were used. Among the boys three HA and four LA were so described; among the girls eight LA and four HA were so described. The fact that much of the behavior of 50 per cent of the LA girls could not be interpreted by the observer is undoubtedly related to the previously described differences in achievement behavior between HA and LA girls.

#### *References to Academic Ability*

Of the 16 LA boys eight were explicitly labeled as either superior or adequate in academic ability, one as somewhat inadequate; in seven cases there was no mention at all of academic ability. Of the HA boys three were labeled as either superior or adequate, five as having an academic problem; there was no reference to academic ability in eight cases. There was no trend at all in the distribution of these observational labels between HA and LA girls. These results suggest that in contrast to the LA boys the academic ability or performance of the HA boys was less impressive, whereas there was no difference between HA and LA girls. Not only was no LA boy described as an academic problem, but more LA than HA boys behaved in a way so as to cause the observer to record either their presumed adequacy or superiority.

#### *Task Orientation*

This variable refers to the degree to which the child could maintain attention to the different tasks presented him. The behavior relevant to this variable was categorized as follows:

1. Task oriented. The child's attention very rarely, if at all, was distracted from tasks.
2. Slight variability. Similar to "task oriented" but child was sometimes distracted from a task, or allowed himself to be distracted. The amount of attention given to different tasks varied slightly (e.g., between reading and arithmetic).
3. Marked variability. The child was very attentive sometimes but very distracted at other times.
4. Generally distractible. Attention to classwork was negligible.

It seems clear from Table 1 that the HA boys again presented a less favorable picture (or created a less favorable impression on an observer) than did LA boys. If one were to combine the "task oriented" and "slight variability" categories, there would still be a tendency (fourteen LA vs. nine HA) for the LA boys to give a picture of greater efficiency in performance. The major difference between HA and LA girls is that more of the latter were found in the "generally distractible" category. If one were

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TABLE I

DIFFERENCES IN TASK ORIENTATION BETWEEN HA AND LA GROUPS

	<i>Task Oriented</i>	<i>Slight Variability</i>	<i>Marked Variability</i>	<i>Generally Distractible</i>
LA boys ..	10	4	0	2
HA boys ..	4	5	5	2
LA girls ..	5	0	5	6
HA girls ..	4	5	5	2

to combine the first two and last two categories, one finds again that the more favorable impression was created by the HA girls.

*Motor Behavior*

The original observations of each child were scrutinized and a tally made of various types of motor behavior (e.g., nail biting, tongue movement, mouthing noises, wiggling, etc.). There was a marked tendency for HA boys, in contrast to LA ones, to manifest more different types of motor behavior, whereas the reverse tendency was the case between HA and LA girls. Unfortunately, however, it turned out that one of the two observers noted motor behavior in her observations to a much greater extent than the other—an observer difference which did not occur with other variables we have discussed. Although the results of the motor behavior analysis are compatible with our other findings, particularly in the case of the HA and LA boys, we are clearly not justified in doing anything other than mention the findings and their ambiguity in light of the observers' different degrees of attention to motor behavior.

*Teacher Relationships*

Characterizing the child's attitude toward a relationship with the teacher is difficult because of the different ways in which such attitudes or relationships were manifested. During the course of a single observation the child might be seen as having different kinds of relationships with the teacher. For example, at one point a child may ask the teacher an unusual number of questions while at another point he may be misbehaving in order to get attention—both types of behavior being phenotypically different while perhaps being genotypically the same. For the purposes of the present study, however, we have put a child into what was for him the most frequent category. Among the HA boys there were six cases who tended to ask an unusual number of questions of the teacher, suggestive either of dependency or attention-getting. There were three such cases among the LA boys. There were four HA boys whose behavior changed markedly when the teacher was near them in that they would then make a display of concentrated study—or in some way acted as if hoping to

avoid the teacher's attention; in three of these cases the description seemed to suggest that the child feared the possibility of censure by the teacher (one of these cases was explicitly described as "scared"). There was no such case among the LA boys. There were, therefore, ten HA and three LA boys whose overt behavior in relation to the teacher suggested insecurity. In the remaining cases in each of these two groups the behavior in relation to the teacher was ambiguous or, more frequently, the observations simply did not contain material relevant to the problem. Among the girls the content of the observations was of a different quality. For example, whereas nine boys characteristically asked many questions of the teacher, only one girl was so described. The kinds of differences observed between HA and LA boys were not observed between HA and LA girls.

#### DISCUSSION

The major question arising from our results is why expected differences were obtained between HA and LA boys and not between HA and LA girls? In contrast to LA boys with whom they were matched for grade and IQ, the HA boys did not seem as academically impressive, their attention to tasks not as persistent, and their relationship to the teacher more suggestive of feelings of personal and academic inadequacy. In the Rorschach study (2), in which these same children participated, the HA boys, in comparison to LA ones, were also behaviorally more dependent and insecure—differences which were not found between HA and LA girls. In the experimental learning study (5) with these subjects the HA boys performed significantly more poorly than their LA counterparts, whereas no significant differences were found between HA and LA girls, although the trend was in the same direction.

There is one respect in which the results of the classroom observations differ from previous findings. Whereas we have previously found no marked differences between HA and LA girls, in the classroom observations it was the HA girl in contrast to the LA one who manifested a greater need for achievement, less "unintelligible" behavior, and more persistent attention to tasks at hand. Behaviorally the LA girls seemed more similar to the HA rather than the LA boys. Why, therefore, does not one get differences between HA and LA girls on performance criteria? It is conceivable that HA girls are not as anxious as their anxiety scores suggest and/or that LA girls are not as free from interfering modes of response as their scores would suggest.

A possible explanation of our various findings with our 32 matched pairs is a sampling one: we could have been, so to speak, less fortunate in choosing our girls than our boy subjects. We had anticipated the need for replication and had planned to carry out in England, in connection with our studies there (4), studies identical to those done in our country. If similar results could be obtained cross-culturally, it would reduce the

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cogeneity of an explanation based on sampling. This turned out not to be possible and, instead, replications in the United States are planned. However, other studies (2, 4, 5) which we have done with our anxiety scales strongly suggest that our findings with our matched pairs may involve factors other than sampling ones. Our present thinking about the problem involves several hypotheses:

1. In our culture, at least, it is generally more difficult for boys than for girls to admit to anxieties, worries, or fears. While we expect and support such admissions in girls, we do not so react to similar behavior in boys. It is these hypotheses which we think helps explain why girls consistently get higher scores on our anxiety scales.

2. High anxiety scores are relatively uncommon among boys and when such scores are obtained they reflect negative self-attitudes and modes of responding which might be termed interfering. One would expect, therefore, that HA and LA boys would be differentiated from each other on performance criteria.

3. High anxiety scores are not uncommon among girls and when such scores are obtained they do not necessarily reflect negative self-attitudes or interfering modes of response. In addition, and as the classroom observations suggest, high scores among girls may reflect an unusually high level of motivation to achieve which does not have adverse effects on performance. One would not necessarily expect, therefore, that HA and LA girls would be differentiated from each other on performance criteria.

4. Low anxiety scores are somewhat unusual among girls (certainly more unusual among girls than boys) and it may be assumed that some of the low-scoring girls have an unusually strong need against admitting anxiety, reflecting, perhaps, a stronger anxiety than in the case of a low-scoring boy whom we expect to "hide" his anxiety. This would be an added factor working against differentiation between HA and LA girls.

5. Finally, it may be that the content of our scales taps areas of anxiety more pertinent to boys than to girls. It is our impression, based primarily on interviews with parents, that eliciting and maintaining positive affective reactions from significant adults is more important to girls than to boys, and thus more likely to be accompanied by anxiety in girls. If, for example, one could devise an anxiety questionnaire concerning attitudes toward and experiences with teachers and other significant adults, one might then find significant differences in performance between HA and LA girls.

Studies are being planned to evaluate these hypotheses. However, it is our present opinion that concentration on the last hypothesis will prove to be the most fruitful.

## SUMMARY

This study involved the direct classroom observations of high (HA) and low anxious (LA) children, anxiety being defined by scores on test

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anxiety and general anxiety scales. There were 32 pairs of subjects matched for grade, sex, and IQ score but differing in anxiety score. Satisfactory reliability of observations was established. HA boys differed from LA boys in that they did not appear as academically adequate, showed less task orientation, and in relationships with the teacher manifested greater insecurity. HA girls differed from LA 'girls in that they seemed to have a stronger need for achievement, showed less "unintelligible" behavior, and contained fewer distractible individuals. The relationships of these findings to those obtained on the same subjects in other studies are discussed. Several hypotheses were advanced to account for the differences in the correlates of anxiety scores in boys and girls.

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## HUMAN FIGURE DRAWINGS OF HIGH AND LOW ANXIOUS CHILDREN<sup>1</sup>

CYNTHIA FOX, KENNETH DAVIDSON, FREDERICK LIGHTHALL,  
RICHARD WAITE, and SEYMOUR B. SARASON  
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This study explores the differences between high anxious (HA) and low anxious (LA) children in their drawings of human figures. It is part of an ongoing project investigating the measurement and correlates of anxiety in school children. The construction and validation of the anxiety measures, the test anxiety scale and the general anxiety scale, have been described in earlier reports from the project (1, 3, 4).

The testing procedure involved administration of the two scales in a single group session to a large sample of subjects. Interpolated between the two scales, to reduce possible fatigue and boredom, was the task of drawing a boy, drawing a girl, and drawing a house. It was our expectation that some reflection of a child's level of anxiety or of correlates of his anxiety level would appear in this sort of independent, semistructured, expressive task. In this study, only the human figure drawings were considered.

### METHOD

#### *Subjects*

Subjects consisted of three distinct samples drawn from 747 first through fourth grade children who had taken the anxiety questionnaires. Each of the first two samples, which were used for exploratory work, consisted of those boys and girls from two randomly selected schools who were in approximately the upper and lower quartiles on the general anxiety scales. Each of these samples contained about 40 subjects. The third and final sample, for which results will be reported, consisted of 32 pairs of subjects matched for grade, sex and average verbal and nonverbal T-score

<sup>1</sup> The project of which this study was a part is being supported by a grant from U.S.P.H.S.

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on the Otis Quick Scoring Mental Ability Test (Alpha). One member of each pair of subjects was in the fourth quartile of scores on Test Anxiety and General Anxiety scales while the other was in the first quartile. There was an equal number of boys and girls in each anxiety group. Overlap between the three samples was avoided.

### *Procedure*

The drawings in the first sample were examined with no knowledge of the anxiety scores of the subjects and an attempt was made to judge each child's set of drawings as HA or LA. Predictive accuracy was very poor. Following this, a list of about 20 variables of the drawings was drawn up which seemed likely to correlate with anxiety level. These variables were selected on the basis of theoretical expectations, reports in the literature, and careful examination of the drawings in sample I. Each set of drawings in sample I was scored on a two-point scale for presence of each variable. Of the initial set of variables, nine seemed promising in discriminating between HA and LA subjects. The drawings in sample II were scored with respect to each of these nine variables and six discriminated significantly between HA and LA subjects. It was only at this point that sample III, consisting of the 32 matched pairs of children, was examined. The experimenter first made the judgment of HA or LA for each set of drawings on the basis of total clinical impression. With no knowledge of the accuracy of these predictions, she scored the drawings for each of the six variables that emerged from work with samples I and II.

Reliability of scoring was established by having another investigator, who had not previously worked with the drawings, score the drawings in sample II for the six discriminating variables. After sample II had been scored, the two scorers discussed disagreements and tried to clarify scoring criteria. Sample III was then scored by the second investigator. It should be noted that, with the exception of work with sample I, all judgments were made without knowing whether subjects were HA or LA.

## RESULTS AND DISCUSSION

The results reported here derive from work with sample III. The six variables which were scored and their definitions are as follows:

1. *Mutilation*—scored as present if one or more limbs or facial features (eyes, nose, mouth) is absent; or if either ears, hands or feet are absent when they had been included in one of the two drawings. Thus, mutilation was scored if a child had drawn hands on one figure but not on the other. It was not scored if no hands were drawn at all. Mutilation was also scored if one or more limbs was *markedly* small compared to the rest of the body.
2. *Smile*—scored present if the corners of the mouths in both drawings turned upward or if the corners of the mouth in one of the drawings



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turned up and the other was ambiguous. Scored absent if both were ambiguous or if one or both turned down.

3. *Shading*—scored present if there was any blackening in of portions of the drawings. The one exception was hair which was filled in by most of the children and therefore not scored.

4. *Arm position—down*—scored present if one or more arms made less than a 45 degree angle with the body or turned in toward the body.

5. *Rigidity*—scored present if the figures appeared rigid, unable to move, likely to topple over if they did move.

6. *Playfulness—humor*—(most subjective of the judgments) scored present if a particular detail or some expressive stance of the figure communicated a kind of playful, humorous mood. (This was not the antithesis of rigidity since drawings scored as playful included some that were also scored rigid.)

All of the variables discriminated significantly between HA and LA subjects in the directions predicted on the basis of results from samples I and II. Thus, HA subjects tended to have more mutilation and more rigidity in their drawings than LA subjects. Smiling, arm-position-down, and playfulness-humor tended to occur more often in the drawings of LA subjects than in the drawings of HA subjects. Shading was more complex. As was predicted, shading tended to be associated with high anxiety in boys and low anxiety in girls. A chi square analysis was used to test the significance of the differences and results are presented in Table 1. Since the directions of the relationships were predicted, a one-tail probability value is reported. Scoring reliability is reported in terms of the phi coefficients and is also presented in Table 1.

TABLE 1

RELIABILITY OF SCORING, AND DIFFERENCES BETWEEN HA AND LA CHILDREN IN FIGURE DRAWING VARIABLES

<i>Variable</i>	<i>Directional Difference</i>	<i>p</i>	<i>Scoring Reliability</i>
Mutilation .....	HA > LA	<.02	.84
Smile .....	LA > HA	<.01	.86
Shading .....	HA boys > LA boys	<.02	.92
	LA girls > HA girls		
Arm position—down ..	LA > HA	<.02	.89
Rigidity .....	HA > LA	<.01	.79
Playfulness—humor ...	LA > HA	<.01	.77

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The attempt to judge anxiety level from an over-all examination of the drawings resulted in 46 correct placements ( $p = .02$ ). It should be noted that it was the judge's impression that her assignments were based on an over-all impression, the determinants of which are difficult to specify. While there undoubtedly was some consideration of the six variables in making these judgments, they did not seem primary. When considered in the light of the judge's inability to discriminate HA and LA drawings at the beginning of the study (Sample I), this finding suggests that significant learning did occur as a result of familiarization with this type of material. Thus, having looked at enough drawings and compared them with anxiety scores, the judge could learn to discriminate between the productions of subjects who scored HA and subjects who scored LA.

Explanations of the relation between the six variables and anxiety level must remain speculative in an empirical correlational study of this sort. At a speculative level, however, it seems that the three variables which correlated negatively with anxiety (presence of smile, arm position-down, and humor-playfulness) reflect a degree of freedom to become involved in a creative task in an expressive, pleasurable, and nonconstricted fashion. In contrast, the tendency for these features to be absent in the drawings of HA children along with the tendency for mutilation and rigidity to be present suggests that in the HA child, accuracy, spontaneity, and expressiveness are interfered with, at least in a semistructured creative situation of this sort, and that for him it is a more threatening and less pleasurable experience than for the LA child. The increased presence of mutilation in the drawings of HA children suggests, in addition, some concern with and questioning of body integrity and adequacy. It is consistent with an earlier finding of more anatomy responses in the Rorschach records of HA children (2). We have no ready explanation for the different direction of relationship between shading and level of anxiety in boys and in girls. This finding is consistent, however, with earlier results (1, 2, 4, 5) which suggest that some of the correlates and modes of expression of anxiety may be different for boys than they are for girls.

## SUMMARY

This study concerned the human figure drawings of high (HA) and low (LA) anxious children, anxiety being defined by scores on test anxiety and general anxiety scales. Thirty-two pairs of subjects were used, matched for grade, sex and IQ score but differing in anxiety scores. The variables scored were determined by analyses of drawings of two independent "pretest" samples. Scoring reliability was satisfactory. The six variables scored with the final sample of 32 pairs differentiated between HA and LA subjects as they did in the two pretest samples. The drawings of HA subjects showed significantly more "mutilation" and "rigidity" than did those of LA subjects. The drawings of LA subjects, in contrast to those of HA

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subjects, showed significantly more "playfulness-humor," "smiling," and "arm position down." HA boys had more shading than LA boys while LA girls had more than HA girls, again as found in the two pretest samples.

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## THE NEED FOR SIMPLICITY IN RESEARCH IN CHILD PSYCHOLOGY<sup>1</sup>

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Perhaps the best way to begin this paper is to explain what the writer means by simple research in child psychology. A few examples should suffice: (a) the effects of interference on crank turning behavior (16); (b) an experiment involving the learning of concepts of size (6); (c) an investigation of reinforcement variables affecting the resistance to extinction of a simple response of placing a ball in a hole (1). In each of these problems the behavior studied is relatively simple, particularly in relation to far more complex responses involved in studies of social development, or in investigations of the effects of child rearing methods on personality growth. It is felt that the best way to begin the argument for the current need for simple research in child psychology is to make an analysis of a characteristic area of research involving exceedingly complex variables. For this purpose, the writer has selected the general area involving the effects of child rearing variables on personality development. Out of this analysis and subsequent argument should come the impression that the writer's main reason for favoring "basic" research is a methodological one. Following this discussion, the writer will present some of the important uses of the study of simple processes in child psychology, and follow this with a treatment of the advantages that such a research orientation has.

The research literature in child development is replete with investigations concerned with the relationships between early guidance or child rearing procedures and personality development of children. The independent and dependent variables of these studies are typically complex, hard-to-measure processes. Many of them involve attempts to measure the effects of such variables as punishment, affection, rejection, breast feeding, and home atmosphere on the adjustment of the child. Measures of these child rearing variables are usually obtained through interviews, rating scales, projective tests, or observational procedures. The adjustment or response measures are typically scores on paper and pencil personality tests, clinical judgments, teacher ratings, or responses in projective doll play situations.

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<sup>1</sup> This paper is a longer version of a contribution to a symposium, "Trends in Developmental Psychology," presented at the Rocky Mountain Psychological Association meetings in 1957.

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Correlations between these child rearing and adjustment measures are calculated, and if they differ significantly from zero, the investigator typically concludes that he has discovered a useful relationship in the science of child rearing.

Much has been written about the unreliabilities of the interview, the rating scale, personality tests, and clinical judgments. It is not within the scope of this paper to go into a detailed review of the difficulties associated with the use of these methods. Suffice it to say that there are problems of recall of the desired information by the parent, of intentional or unintentional falsification of responses, of definition, and of projections or misinterpretations by clinicians, parents, and teachers.

To illustrate what the writer considers the prematurity of research at this complex level in child psychology, perhaps the analysis of an hypothetical example will prove helpful. Let us suppose that an investigator wishes to study, among other things, the relationship between the duration of breast feeding in infancy and the frequency of dependency behavior of elementary school children. Measures of duration of breast feeding are obtained by the interview, while measures of dependency are taken in a standardized projective doll play situation. For the sake of the argument, let us assume that the investigation is conducted with the greatest possible care. Much preparation has gone into the interview and the doll play procedures in order that the researcher reduce to a minimum the invalidities and unreliabilities of the study due to these factors. Further, let it be assumed that the investigator finds a significant inverse correlation between duration of breast feeding and the frequency of dependency behavior.

To what extent is he justified in claiming the discovery of a relationship between these variables? Obviously the experimenter is not manipulating the independent variable. Though a relevant variable can be isolated and studied without the experimenter's manipulating it, the difficulty with this procedure, as McCandless and Spiker (11) recently pointed out in an appeal for more experimental research in child psychology, is greatly increased as the number of relevant variables affecting the dependent system is increased. And as McCandless and Spiker in the same paper further point out, "That a very large number of variables affects the behavior of the living organism is a fact that has long been recognized" (p. 76). Here is the crux of the difficulty: the number of relevant variables affecting the dependent system in complex research, as in the hypothetical example, is undoubtedly far greater than those affecting relatively simple responses. Furthermore, they are infinitely more difficult to isolate and control. In fact, the control of variables associated with the study of the effects of child rearing techniques on adjustment is in most cases impossible at the present stage. Indeed, it is highly probable that the great majority of these variables is as yet unidentified. Some of the possible variables more obviously relevant to dependency, other than the duration of breast feeding, are the character structure of the parents, friendship patterns, socioeconomic class,

genetic and constitutional factors, and the nature of sibling relationships. Variables such as these are more often than not unconsidered in studies at this level, and even if efforts to study them were made, the outlook would indeed be bleak, since it would be difficult if not impossible to say which has affected the dependent variable, and to what degree. The end result of this state of affairs is, of course, that the experimenter thinks he has discovered a relationship in child rearing variables, when in reality there is a good chance that one or more of the unconsidered variables mentioned above has brought about the change in the dependent variables. Any well trained scientist must admit that because of the above reasoning, there is, at the very best, only a slight, highly equivocal suggestion in the results of the above described hypothetical study that there is a meaningful relationship between the variables studied, certainly not enough to warrant the confident statements about child rearing problems one frequently sees emanating from such research. It is not at all unlikely that many child psychologists have been misled into conducting further research along these lines, to say nothing of the possibly more serious consequences of parents being misled by reports of these studies.

At this point it seems appropriate to point out some important uses of more basic research at the present stage of maturity of developmental psychology. If one has followed recent issues of *Child Development*, *The Journal of Experimental Psychology*, and other psychological journals, it is unmistakably clear that one of the newer trends in developmental psychology is a preoccupation with basic research problems that relate to some of the significant problems in general psychology, particularly within a stimulus-response framework. Two of these problems will be described briefly, along with some of the research that has been performed with children bearing on these issues.

First, there is the principle of stimulus generalization, which has been used in general behavior theory to explain, among others, such phenomena as the occurrence of sudden or insightful solutions of problems and the persistence of behavior that is not rewarded, or is even punished. One of the important variables assumed to affect the generalization of a response is the number of reinforcements given on the training stimulus. Razran (14) reports that the evidence from classical conditioning with infrahuman and adult human subjects demonstrates fairly conclusively that an increase in the number of reinforcements on the training (conditioned) stimulus results in an increased amount of generalization to the test stimuli. Spiker (21) has developed a simple technique to extend these findings to the young child. The Ss, preschoolers, were trained to pull a lever repeatedly to a stimulus of a given hue in order to receive marbles. They were then tested on stimuli of different hues to determine the number of responses that would be made to the test stimuli without receiving reinforcement. A group given 24 reinforcements to the conditioned stimulus prior to the generalization test averaged nearly twice as many responses to the test

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stimuli as did a group given only 12 preliminary reinforcements. Thus, the same relationship found to exist at the infrahuman and human adult levels was found to apply to the preschool child. Spiker (22) in a later experiment found that the steepness of the generalization gradient was also a positive function of the number of reinforced training trials as well as the intensity of the stimuli used in the training. In this experiment 60 Ss were given differential reinforcement to a white (positive) and a blue (negative) light. For one half the Ss, the positive stimulus was the brightest of four stimuli differing from each other in brightness; for the other half, it was the dimmest. One half of each of these groups was given 12 presentations and the other half was given 24 presentations of each the positive and negative stimuli. The response was again the repeated pulling of a lever for marbles during a 3-second presentation of the conditioned stimulus, and the response measure was the number of such responses that occurred during the 3-second periods. Immediately following training, the Ss were tested, without reinforcement, on each of the four stimuli differing in brightness. As was mentioned above, the findings were: (a) a steeper gradient for the Ss who received the greater number of reinforced training trials, and (b) a steeper gradient for the bright-trained than for the dim-trained Ss. These results are in agreement with the experiments by Grice and Saltz (5) and by Brown (2) at the infrahuman level, and with the prediction made by Hull (8) on the basis of the principle of stimulus dynamism.

The second principle from general psychology which has received recent attention in child psychology is the principle of secondary or mediated generalization, sometimes referred to as acquired equivalence of cues. In brief, this principle states that if *S* has been trained to make the same response to two or more dissimilar stimuli, there will be an increased tendency to generalize to the other stimulus other responses subsequently learned to one of the stimuli. In other words, if *S* is taught to make response 1 to stimuli 1 and 2, then taught to make response 2 to stimulus 1, he will make response 2 to stimulus 2. Jeffrey (9) has demonstrated the role of mediating responses in generalization. He trained his Ss to move a lever, again a simple dependent variable, in one direction to a white stimulus, and in the opposite direction to a black stimulus. He then taught some Ss to call a gray stimulus "white" and others to call it "black," and next retrained the Ss on the lever moving task to the white and black stimuli. Following this, he presented the gray stimulus interspersed with black and white stimuli to determine how the Ss would respond to the gray stimulus. He found that, if the Ss had been taught to call the gray stimulus "white," they responded to it as they did to the white stimulus; if they had been taught to call the gray stimulus "black," they responded to it as they did to the black stimulus. He found a similar tendency for another group of Ss who instead of using the names "black" and "white" had been taught to turn the handle to the right or the left for the white, black and gray stimuli. Thus, Jeffrey demonstrates that either verbal or



motor responses may serve as mediating responses. Shepard (18) and Eisman (3), among others, have also recently demonstrated mediated generalization in young children.

The study of simple responses like the ones described in the experiments above may be made in more applied, pragmatic research with children. For example, in the important area of incentives in children's learning, the writer and Kennedy (24) have recently shown that a candy reward results in quicker learning and more consistent transfer of a "larger-than" concept than either praise, reproof, a light flash, or a delayed reward. The only exception to this latter statement was the nonsignificant difference that existed in the consistency of transfer between the candy reward group and the group that was given a delayed reward. In this experiment the behavior studied was a simple button-pushing response to the larger of two three-dimensional geometric objects. The nonsignificant difference in the candy (immediate) and delayed reward group of the aforementioned study led the writer (23) to perform an experiment comparing two types of delayed rewards with each other and with a immediate reward in the learning and transferring of a "larger-than" discrimination. It was hypothesized that Ss assigned to a delayed reward condition which permitted them to observe progress toward the to-be-received reward would learn more quickly and transfer more consistently than would Ss assigned to a delayed reward condition that did not allow them to observe their progress in the learning situation. This hypothesis was convincingly supported by the results of the experiment.

Now what advantages do the studies of simple behaviors in the experiments cited above have, other than their contributions to general psychology? As was stated previously, they are mainly methodological. First of all, when we study basic responses, the variables, both independent and dependent, are easier to manipulate. Compare, for example, the difficulties associated with isolating, controlling, and measuring complex child rearing and adjustment variables with the relative ease and rigor of control in (a) Jeffrey's study of the effects of simple verbal instructions, "say white" or "say black," on crank turning responses, or (b) Spiker's experiment with the generalization of lever pulling responses to lights of varying hues, intensities, and frequencies. Because of the more rigorous control exercised in the latter experiments, the experimenter minimizes the danger of masking the basic processes. That we can be less equivocal about interpreting the results of these experiments is obvious.

In most experiments the researcher has a choice in the matter of selecting responses to be studied. For example, Spiker may well have studied the principle of stimulus generalization within a more complex, clinical framework, by obtaining measures of generalization of responses of children from maladjusted teachers to peers or love interests, instead of studying the generalization of lever pulling responses to lights of differing intensities and hues. Or again, the writer may have studied the effects of various

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incentives on the solution of higher mathematics problems, or on some of the more intricate aspects of social development in childhood. That we are all interested in the latter problems is a foregone conclusion. In fact, the critics of the writer's position will ask the question, "Of what practical value is it to investigate these simple, trivial behaviors? What we need to know, indeed what society is demanding of us now, is the solution of important practical problems in developmental psychology, such as the complex factors involved in learning and personality development." The writer's answer to this argument is that he believes that ultimately we will be able to supply answers to the complex, immediately relevant social problems associated with child psychology more quickly if we first systematize our knowledge of relationships existing at an elementary behavior level. By doing this we do not get ahead of our limited methodological resources, which has always been one of the greatest tendencies of researchers in child psychology. And what is even more important, we do not run the serious risk of misleading society.

Critics of this position will insist that the writer be more specific about *how* the study of relatively uncomplicated problems eventually will facilitate a rigorous, more fruitful investigation of such phenomena as are involved in complex learning or personality development. It is felt that not only will the current concern for basic research with children mean that we keep our investigations within the limits of our methodological resources, but it is also believed that, because of the above, basic research is likely to result in the discovery of variables relevant to complex human behavior. For example, the writer (23) has found a strong indication that the speed with which a child learns a simple "larger-than" discrimination without a material reward depends upon a host of child rearing variables associated with social class membership, such as the importance to the middle class child of not appearing unintelligent. Had the relevance of this social class variable been suggested by an experiment involving more complex learning with less rigor of control, it appears reasonable to argue that one would place less confidence in its importance, even in complex learning situations. It is true that a variable related to the learning of a size discrimination may not be important in the learning of principles involved in the solution of quadratic equations, or the variables relevant to the generalization of responses from lights of one intensity to lights of other intensities may not be related to the generalization of responses from maladjusted parents to heterosexual relationships. There is some evidence, however, for contending that the likelihood of variables which are known to apply at a simple behavioral level to be relevant also at a more complex level is greater than the probability that variables suggested as relevant in complicated, poorly controlled studies are in fact relevant at that level. The evidence in support of this statement falls into two categories: (a) the applicability of principles discovered in animal research to more complex human behavior, and (b) the highly inconsistent findings of research in human

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behavior concerned with such complex phenomena as child rearing variables and their effects on personality development.

Rosenblum (15) has found that the acquisition and extinction of "copying" responses by fourth and fifth graders are regulated by the same principles of partial reinforcement as found in animal experiments (20). Kuenne (10) reports that Spence's (19) theory of transposition, formulated to account for animal behavior in a discrimination learning situation, also applies to the preverbal child. Consider also the highly controversial research involving the effects of socialization training on personality. Some studies show the techniques of feeding, weaning, and toileting to be related in a substantial way to security, the quality of adjustment, and other important personality traits (4, 7, 12); whereas others show no relationship between these variables (13, 17, 25). It is felt that the inconsistencies in these investigations are due, among other things, to false leads concerning relevant variables in socialization and personality that researchers get in focusing attention on problems of this degree of complexity.

The writer does not want to take the position that *all* research in complex human behavior is useless at the present stage of maturity of psychology. It must be acknowledged that some of this research is yielding reasonably consistent results, despite the difficulties discussed above. It is felt, however, that child psychology generally would benefit more by an increased concern on the part of many of us with understanding behavior in its more basic forms. Indeed, it is felt that the great preponderance of the research which is now being done at a more complicated level will have to be redone in the light of the results of the more basic research in child psychology.

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## SOCIALIZATION OF AGGRESSION AND THE PERCEPTION OF PARENTS IN FANTASY

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Research on both the prediction and determinants of overt aggression in children has usually focused on the intensity of aggressive motivation as a major antecedent variable. For example, in studies attempting to predict overt aggression from related fantasy it has been usual practice to correlate a broad index of fantasy aggression with a category of overt aggressive behavior like fighting or delinquent activity. The implicit hypothesis seems to be that frequency of fantasy aggressive acts is an index of aggressive drive and should be positively correlated with occurrence of overt aggression. Most of these studies failed to find a positive and linear relation between these two variables (7, 11, 15, 16). However, recent investigators (5, 9, 12, 13) have stressed that aggressive motives are conflictful and subject to inhibitory influences and they have attempted to measure the strength of these avoidance or inhibition tendencies. In these more recent studies evaluation of fantasy indices of aggression anxiety significantly improved the power of the fantasy behavior to predict occurrence of overt aggression.

The present research utilized hypotheses concerning the child's acquisition of inhibitions on aggression to predict types of fantasy content that should be related to overt aggression in young boys. Current theorizing about the developmental determinants of aggressive behavior suggests that a perception of the parent as hostile and nongratifying influences the child's predisposition to aggressive behavior in two ways. It has been assumed that these conditions increase aggressive motivation and, in addition, are contrary to the conditions which motivate the learning of prohibitions on aggression. With respect to the latter, it is suggested that an important motive for the acquisition and practice of parental prohibitions on aggression is anxiety over anticipated loss of parental love. The more intense the anxiety over this anticipated loss the stronger will be the re-

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sponse of adhering to the prohibitions of the parents. That is, the child trades the gratification derived from being aggressive for the continued love of his parents. Mahler (10) has stated,

Education, from the simplest gradual domestication and training of the infant up to the learning of skills and high scholastic achievement, can be compared with a continual barter in which the child is brought to give up infantile, egoistic and increasingly unacceptable, immature and objectionable behavior in return for tangible or intangible premiums, symbolizing love (p. 45).

It is hypothesized that the degree of anxiety generated by anticipation of loss of parental love depends, in part, on (a) the degree to which the child feels dependent on the parent for support in time of need and (b) the degree of nurturance given the child. These two variables are apt to be positively related and difficult to assess separately since a child should gradually extinguish on dependent overtures to parents if requests for support and nurturance were not gratified to some extent. Furthermore, an excessively nurturant and indulgent mother tends to prevent independent behavior from developing and the strength of the child's dependent tendencies remains at a high level. The position taken here is that the combination of a dependent child and a nurturant parent is most apt to generate anxiety over the anticipation of withdrawal of nurturance since the child feels he requires continued parental support. Thus, a dependent child who perceived the parents as nurturant would be highly motivated to adopt the prohibitions of the parents since disobedience should elicit anxiety over possible rejection. On the other hand, the child who was minimally dependent on the parent and who perceived the parent as hostile and nongratifying should feel less anxiety over anticipation of loss of love for such a loss would be viewed as less dangerous. Such a child would be minimally motivated to adopt and practice parental prohibitions. Existing data support these ideas. Several research reports suggest both a positive relation between maternal rejection and overt aggression in the child and an inverse relation between maternal overindulgence and the child's aggressive activity (1, 3, 8, 19). In a more recent study based on interviews with middle and working class mothers (17), Sears *et al.* found, for boys, a positive relation between dependency on the mother and a measure of the child's conscience and an inverse relation between maternal rejection and degree of conscience development. The authors conclude, "the pattern most calculated to produce 'high conscience' should be that of mothers who are usually warm and loving and then, as a method of control, threaten this affectionate relationship" (p. 388).

One final set of statements must be made explicit before the specific predictions can be stated. First, among young boys one can differentiate between unprovoked and justified aggression (8, 14). Although the former is generally punished by parents, the latter is often approved and encouraged by peers and family, and the young boy learns that aggression is

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expected and justified when he is attacked by his social environment. If it is further acknowledged that most boys encounter situations in school justifying some form of aggressive retaliation, then chronic and consistent absence of aggressive behavior would indicate very strong inhibitory responses on overt aggression.

On the basis of the above discussion it was predicted that in comparing extremely aggressive and nonaggressive boys the former should perceive the parents as less gratifying and more hostile and show less dependent behavior toward the parents than the latter.

In this study the major technique used to measure the child's perception and relationship to his parents was a fantasy situation in which the child told stories to pictures specially devised to suggest themes of dependence on adults, nurturance from adults, anger between a child and parent, and parental punishment. It was expected that nonaggressive boys would report more dependency and parental nurturance themes and fewer themes involving anger between parent and child than a group of extremely aggressive boys.

A major problem in assessing the fantasy involved the question of whether certain fantasy content is or is not representative of the child's environmental behavior and experiences. Some investigators (15, 18) have implied that fantasy is apt to be representative of the child's environment and behavior when the fantasy behaviors and events are not goal states that are usually prohibited and/or frustrated. Parental anger and hostility are not usually regarded as desired goals, and dependent behavior toward an adult is not strongly prohibited in children. In this regard, Kagan and Mussen (6) found a significant positive relation between dependency themes on the TAT and overt dependent behavior among a group of male college students. It is therefore suggested that the specific fantasy content under study might be dominated by themes and actions representative of reality.

## PROCEDURE

The subjects were 118 boys (Ss) drawn from seven classes (grades one through three) in a Columbus, Ohio, public school. Their ages ranged from 6-1 to 10-2 with a median age of 7-0. The school population was predominantly middle class, the majority of the fathers being skilled laborers and tradesmen. Before initiating interviews with each S the experimenter (E) spent several hours with each of the seven classes in order to become familiar with the children. After introductory games had established rapport in the interview, the E introduced the fantasy task with the following statement:

Let's play a guessing game now. I have some pictures here and I want you to guess what's happening on the picture. You have to make up a story to tell what you think is going on in the picture.



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Thirteen pictures were administered, nine of which illustrated either a man or woman interacting with a small boy. The remaining four showed boy-boy interactions and are not relevant to this report. The nine adult-child pictures, in the order of their presentation, were as follows:

1. A boy is sitting on a chair holding a broken shoe lace and a woman is standing in the background.
2. A crying boy is sitting on the floor and a woman is standing behind the boy, looking down at him.
3. A boy with bowed head is standing near a bicycle which is turned over and a man is looking down at the boy.
4. A boy with bowed head is approaching a man sitting in a chair.
5. A boy is walking away from a woman who has her hands over her mouth.
6. A boy is holding his hand out to a man who is standing with one hand in his pocket.
7. A boy is crying and a woman is bending over the boy.
8. A boy with a cut on his arm is crying and a woman is standing in the background with her back to the boy.
9. A boy is crying and a man is standing in back of the boy looking down at him.

After the pictures were administered the *E* asked each *S* some questions, three of which are relevant for this report:

1. Who is the boss in your house, your mother or your father?
2. If your mother said one thing and your father said something different who would you listen to, your mother or your father?
3. Let's make believe you were bad at home and your mother and father were both home, who would punish you, your mother or your father?

Each *S* was rated by one person, his teacher, on a five-point scale for the following behaviors: (a) tendency to start fights at the slightest provocation and (b) tendency to hold in his anger and not to express it overtly. These two behaviors were selected in order to obtain a check on the consistency of the ratings. It was assumed that an *S* with a low rating on (a), i.e., never starts fights, would receive a high rating on (b), i.e., always holds in his anger. If the raters were consistent, there should be a high negative correlation between the ratings on these two variables. The product-moment correlation was  $-.94$ .

On the basis of the teacher ratings a group of 21 extremely aggressive boys (Group A) and 21 extremely nonaggressive boys (Group NA) were chosen from the entire sample. These two groups were composed of the three most and three least aggressive *Ss* in each of the seven classes. The *Ss* in both groups had been given extreme ratings on both variables.

Although the fantasy stories were scored for a large variety of themes, only the following content categories appeared with considerable frequency to the nine adult-child pictures.

1. *Dependency*—themes in which a child sought help from an adult with a problem situation.



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2. *Nurturance*—themes in which a child was given unsolicited help with a problem; an adult showed concern for a child's welfare or a child was given money, food or gifts.

3. *Anger to a parent*—themes in which a child expressed anger toward a parent.

4. *Parental anger to a child*—themes in which a parent was angry with a child.

5. *Punishment*—themes in which a parent physically punished a child by spanking, slapping, hitting.

The themes were scored independently by the *E* and a graduate student in psychology without knowledge of the behavior ratings of the *Ss*. Percentage of agreement was high for each category and the over-all percentage of agreement for these five categories was 93 per cent.

## RESULTS

### *Fantasy Data*

1. *Dependency*. Occurrence of dependency themes was more frequent for the nonaggressive *Ss* with 9.5 per cent of Group A and 33.3 per cent of Group NA reporting one or more dependency themes ( $p = .07$ ). All probability values are for one tail and were evaluated by the exact method described by Fisher (2).

2. *Nurturance*. There was no significant difference between the groups with respect to nurturance themes: 57.1 per cent of Group A and 61.9 per cent of Group NA reported this type of theme. However, one of the nurturance categories, "adult concern for a child's welfare," did tend to differentiate the groups with respect to the role of the person who showed this concern. The *Ss* in Group NA labeled the concerned adult as either a mother or father while the aggressive *Ss* described the concerned adult as a policeman, maid, stranger, or other nonparent figure. For the 15 *Ss* who told themes of adult concern, 28.6 per cent of Group A and 87.5 per cent of Group NA labeled the concerned adult as a parent ( $p < .05$ ). One might infer from this finding that nonaggressive *Ss* were more likely than the aggressive ones to perceive the parents as nurturant figures. Supportive data from a study with older boys will be presented later.

3. *Parental anger*. As predicted, more of the *Ss* in Group A than in Group NA told one or more stories depicting parental anger toward a child (76.2 per cent versus 38.1 per cent;  $p < .02$ ).

4. *Anger to parent*. The number of *Ss* in each group telling themes involving anger toward a parent also differentiated the two groups with 38.1 per cent of Group A and 9.5 per cent of Group NA telling one or more of these themes ( $p < .05$ ).

5. *Punishment*. There was no significant difference between the groups on frequency of punishment themes: 52.4 per cent of each group reported one or more of these themes. It is possible that parental punishment is not a sensitive indicator of the gratifying or rejecting nature of the

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parent-child relationship, for Hollenberg and Sperry (4) also found a very low correlation between ratings of maternal frustration and punitiveness on the basis of interview data.

### *Interview Data*

1. *Child's perception of the boss of the family*. Two of the Ss in Group A had no father living with them and they were excluded from the statistical computations. To the question "Who is the boss in your house, your mother or your father?" more of the nonaggressive Ss answered "Mother" (42.9 per cent versus 10.5 per cent;  $p < .05$ ).

2. *Child's preference for obedience*. To the question "If your mother said one thing and your father said something different who would you listen to, your mother or your father?" 57.1 per cent of Group NA and 26.3 per cent of Group A answered "Mother" ( $p < .05$ ).

3. *More punitive parent*. To the question "Let's make believe you were bad at home and your mother and father were both at home, who would punish you, your mother or your father?" 47.6 per cent of the Ss in Group NA and 21.1 per cent of those in Group A viewed the mother as the major punitive agent ( $p = .09$ ).

## DISCUSSION

The aggressive boys produced less themes in which the child showed dependent behavior toward adults or a parent showed concern for a child's welfare and more themes in which the parent-child interaction was characterized by anger. These data tend to support the prediction of a correlation between overt aggressive behavior and fantasy content depicting a hostile parent-child interaction and weak dependent tendencies toward the parent. If the fantasy can be regarded as representative of reality, these results may be interpreted as partial validation for the hypothesis that prohibitions on aggressive behavior are more likely to be learned and practiced when the child is dependent on his parents and perceives them as nurturing and gratifying. Under these conditions the child should be anxious over possible loss of parental gratifications if he fails to adopt the parental prohibitions on aggressive behavior.

The answers to the three direct questions seem compatible with this interpretation. The nonaggressive boys were more likely to describe the mother as the major punitive agent, the parent they would be likely to obey, and "the boss" in the home. This perception of the mother as the dominant figure in the home suggests that the nonaggressive boys would be more likely than the aggressive ones to fear alienation from the mother and therefore more likely to adopt and practice her prohibitions on aggression. If it is further assumed that middle class mothers are apt to place stronger prohibitions on overt aggression than the fathers, the positive

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relation between fear of alienation from the mother and absence of overt aggression tends to support the hypothesis of the paper. It is sometimes stated that one measure of degree of identification in a child is the degree to which prohibited motives have become socialized, and this process has sometimes been labeled "conscience" development. However, the child may use either his mother, father, or other figures as models for identification. The present relation between strong inhibition of aggression and a perception of the mother as authoritarian suggests that a measure of "conscience" development is not necessarily an index of intensity of identification with the same sex parent.

As mentioned earlier, data from a research project at a military school<sup>1</sup> furnished some support for the finding that when a fantasy stimulus suggested nurturance from an adult to a child figure, aggressive Ss were not apt to label the older figure as a parent despite the fact that this interpretation was quite congruent with the external stimulus.

From a total entering class of 683, 170 boys wrote stories to selected TAT cards. The dependent measure of overt aggression for this sample of older adolescent males (age range 17 to 22) was the number of demerits accrued by each boy for violations of regulations during the first five months at the school. The distribution of demerits for the entire class of 683 was divided into quartiles and 29 of the Ss who wrote TAT stories fell in the lowest demerit quartile (low on violations) and 29 were in the highest demerit quartile (high on violations). Analysis of the stories written to TAT card 7 BM which involved nurturance from the older to the younger man (63 per cent of the themes) revealed that 70.0 per cent of the low aggressive men and 31.3 per cent of the high aggressive men labeled the older nurturant figure as the father of the younger one ( $p < .05$ ).

Additional data from a succeeding first year class at the same school furnish similar results. The entire class of 765 subjects wrote short stories to specially devised pictures, two of which illustrated an adolescent male and an older man. The first depicted a boy standing in front of a seated man and the second depicted an adolescent male sleeping in a bed with an older man leaning over the sleeping boy. Approximately one third of the group told stories to each picture in which the older figure nurtured the younger one. The demerit distribution for the entire class was standardized, divided into quartiles and each S assigned a score of 1 to 4 depending on the demerit quartile into which he fell. Comparison of the mean demerit score between the Ss telling themes of nurturance from a father versus themes of nurturance from a nonparent figure revealed that for each picture the latter group had a higher demerit score ( $p < .15$ ). Although

<sup>1</sup> These data were obtained while the author was collaborating on the Medical Research Project, U. S. Army Hospital, West Point, New York, and the author wishes to thank Lt. Col. William Hausman for permission to report these data. The conclusions are those of the author and should not be construed as representing those of the Department of the Army.

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these differences are not highly significant, the results are in the expected direction. One reason for the rather low significance value could be that both of these pictures were less suggestive of a nurturant relation between the adult and the boy than card 7 BM of the TAT. In any case, the results from these three independent studies all suggest that when a fantasy stimulus is congruent with an interpretation of a nurturant relation between a parent figure and younger male, failure to label the adult figure as a parent is positively correlated with overt aggressive behaviors. One might infer that failure to label the nurturant adult as a parent reflects a perception of the parent as nonnurturant.

Although this report has focused on the socialization of aggression, it is believed that anxiety over anticipated loss of nurturance acts as a motive for the socialization of other behaviors, e.g., sexuality and passivity, which also are subject to parental prohibitions. In addition to the partial validation of the hypotheses regarding the socialization process, a second implication of these data concerns the possible predictive power of these fantasy categories with respect to overt aggression. The findings tend to affirm the initial statement that fantasy content which is theoretically related to inhibition of aggression may be a more sensitive predictor of overt aggressive tendencies than the usual practice of summing the number of aggressive acts that a subject includes in his fantasy productions.

## SUMMARY

It was predicted that the fantasy stories of extremely aggressive boys would contain more hostility between parent and child and less dependency on adults than the stories of nonaggressive boys. This prediction was based on the assumption that minimal dependency on parents and a perception of them as hostile would oppose the adoption and practice of parental prohibitions on aggressive behavior, while dependent tendencies and a perception of the parent as nurturant should facilitate socialization of aggressive motives. Individual interviews were held with 118 boys, ages 6-1 to 10-2, in which stories to pictures and answers to direct questions were obtained. Teachers rated the aggressive behavior of the children and the data for the 21 most aggressive and the 21 least aggressive boys were reported. The results showed that more of the nonaggressive boys produced themes of dependency on adults and more of the aggressive boys told stories involving anger between parent and child. In answers to direct questions the nonaggressive children perceived the mother rather than the father as the major punitive agent and the parent they would be most apt to obey. This result indicated that the nonaggressive boys were more anxious about alienation from the mother than from the father. It was suggested that anxiety over alienation from the mother should lead to relatively strong inhibitory responses with respect to aggressive behavior since mothers are apt to be less permissive of aggression than fathers.

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